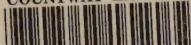


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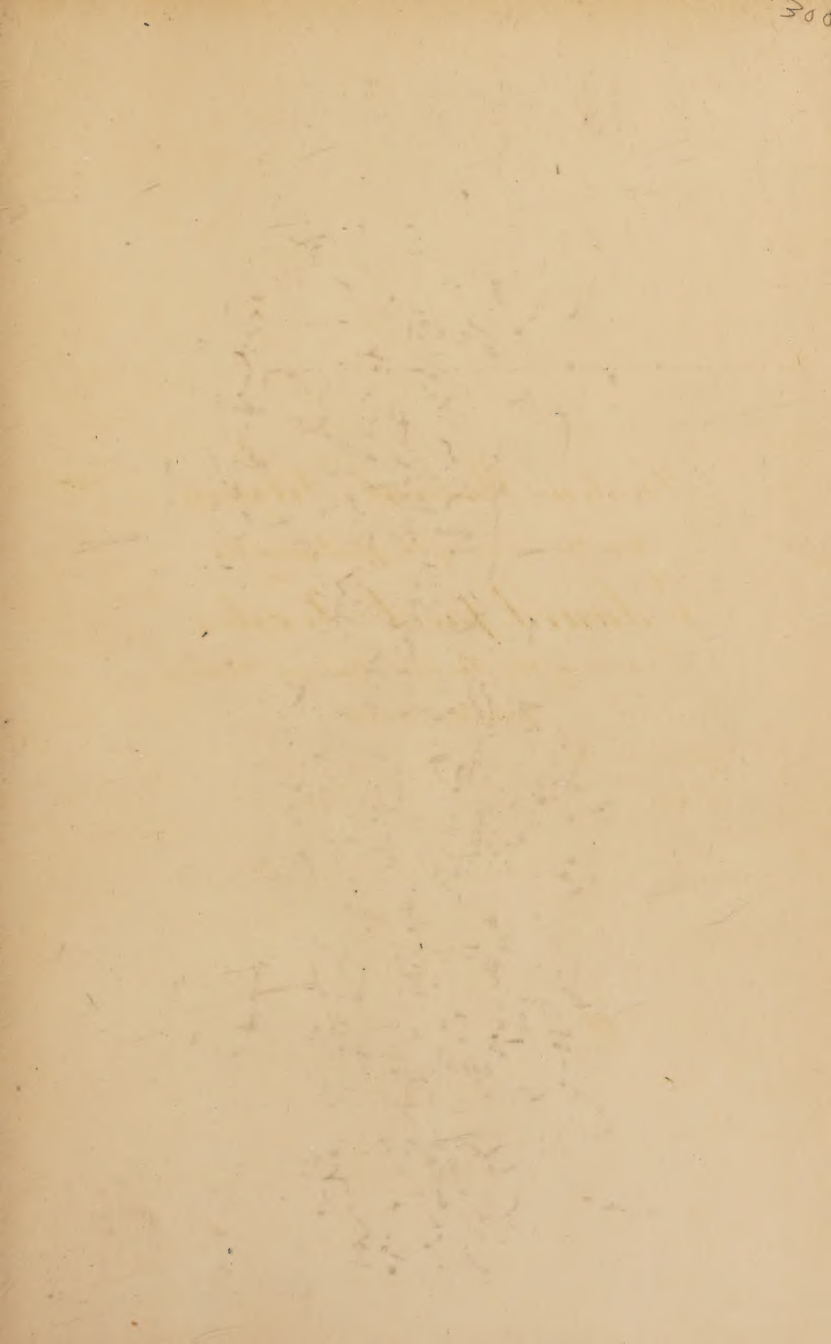
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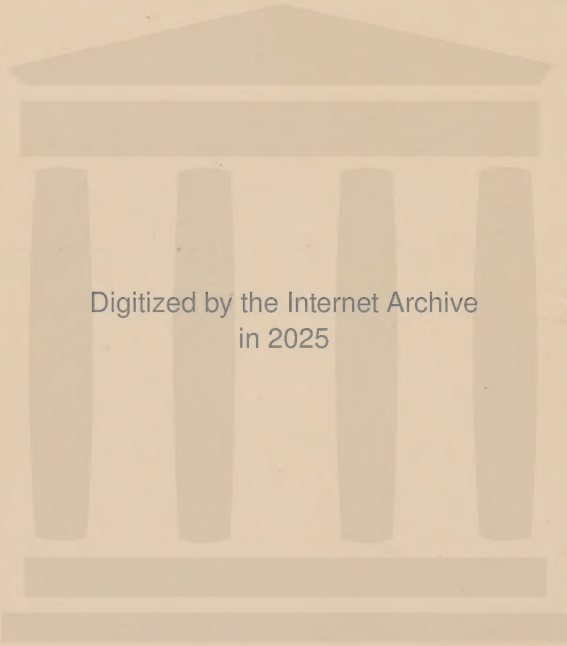
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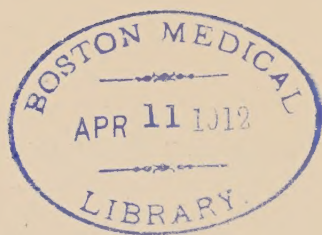
ROBERT JARDINE

M.D. EDIN., M.R.C.S. ENG., F.R.F.P. & S. GLAS., F.R.S. EDIN.

*Professor of Midwifery in St. Mungo's College, Glasgow ;
Obstetric Physician and Gynæcologist to the Glasgow Maternity and
Women's Hospital, Glasgow ;
Examiner in Midwifery and Gynæcology to the Scottish Conjoint Board,
and also to the Victoria University, Manchester ;
Formerly Examiner to the University of Glasgow ;
Late President of the Glasgow Obstetrical and
Gynæcological Society ;
Author of "Clinical Obstetrics," and a
"Practical Text-Book of Midwifery for Nurses," etc.*

WITH ONE HUNDRED AND SEVEN ILLUSTRATIONS
AND THREE COLOURED PLATES

NEW YORK:
WILLIAM WOOD AND COMPANY.
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10493 For

THIS BOOK IS DEDICATED, ON THE CENTENARY OF HIS
BIRTH, TO THE MEMORY OF THAT GREAT
OBSTETRICIAN AND DISCOVERER OF CHLOROFORM,
SIR JAMES Y. SIMPSON, BARONET.

ROBERT JARDINE.

PREFACE

IN the Glasgow Maternity and Women's Hospital the percentage of abnormal cases dealt with is exceedingly high, and, as it has been my good fortune to have been on the active staff of that hospital for eighteen and a half years—thirteen and a half of these years as full physician—my experience in midwifery work has been somewhat extensive. In my large work on *Clinical Obstetrics* I have published details of several hundreds of illustrative cases. In the present work I have refrained from giving details of cases, and have tried to give the result of my experience. It will probably be said of this book, as has been said of *Clinical Obstetrics*, that it is a one-man book, and that is what I hope it is. It is the result of my experience, and not merely a compilation.

Necessarily, much that is in this book has already appeared in *Clinical Obstetrics*, but there are one or two new features, and to one of these I would specially draw attention, viz. to the chapter on the Retraction Ring as a cause of obstruction in labour. In most works on Obstetrics, the Retraction Ring is dealt with in connection with obstructed labour as a result of obstruction, but comparatively little has been written about it as a cause of obstruction. It is to the latter aspect of the question that I wish to

draw attention, as hitherto it has not received the attention which it deserves.

I am deeply indebted to Prof. M. Cameron for the drawing illustrating a case of obstruction from ventro-fixation of the uterus, and for the blocks illustrating the operation of Cæsarean section ; to Dr. Sam Cameron for the loan of two blocks ; to Dr. Fothergill for permission to use many illustrations from his book, and for two photographs of a case of congenital dislocation of both hips ; to Messrs. Smith and Elder for permission to use a number of blocks from Playfair's *Midwifery* ; to the various instrument makers for the use of blocks ; and also to my former student, Dr. M. Fleming, for a number of drawings.

R. J.

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CHAPTER I.

INTRODUCTORY.

LABOUR is a natural process, and the less it is interfered with, the better; but unfortunately there are a good many cases in which active interference is called for. When assistance is required, the obstetrician must not only decide what method of delivery he is to adopt in a particular case, but he must also decide as to the best time for his interference. Too early interference is often as dangerous as too late; while, in other cases, the earlier the interference the better. For instance, take a case of slight disproportion between the size of the head and the pelvis, where forceps delivery will be necessary; in such a case, too early interference is to be guarded against, as time should be allowed for the head to become moulded. On the other hand, if the case be one requiring Cæsarean section, the sooner the operation is performed after the onset of labour, the better for the patient. Indeed, in many cases it is preferable to do the section before labour has actually commenced. Every case must be judged upon its own merits as to the how and when of delivery, and the earlier the obstetrician can make up his mind on these two points, the better for his patient. In some cases, he will be able to decide these important points even before labour has begun.

Where it is possible, a woman should be under

medical supervision throughout her entire pregnancy, but unfortunately the majority of cases are at the best only under a very haphazard supervision during the latter months of gestation. When the medical man is engaged, he should consider that from that time forward, until he ceases attendance when the lying-in period is over, the patient is under his care. The urine should be examined from time to time, and if this cannot be done, the patient, especially if she is a primipara, should be warned to report at once, if she should begin to suffer from headache or swelling of the feet, or should feel in any way out of sorts. If this were done in all cases, and if prompt treatment were adopted when albumin appears in the urine, puerperal eclampsia would be almost unknown.

The question of the advisability of examining the patient before the onset of labour is a very important one. In all primiparous cases a preliminary examination should be insisted upon. With multiparæ it is not so important, but even with them it is better to do it, in order to make sure of the presentation of the child. If the child should happen to lie transversely, it is a very simple matter to alter the presentation into a vertex one by external manipulations, and if steps are taken to keep the head at the brim of the pelvis, the risk to the mother, and even more to the child, will be very much lessened. The preliminary examination will not, as a rule, necessitate a vaginal examination, and there should be no difficulty in getting patients to submit to it. As a rule, by inspection and palpation one can learn all that is necessary, but if the knowledge thus gained points to the fact that there is likely to be an obstruction to delivery, then a thorough examination by the vagina must be insisted upon. Patients, especially primiparæ, naturally shrink from this, but

if the importance of the examination is explained to the patient and her friends, as a rule, no objections will be raised. If objections are made to the proceeding, then the attendant should decline further responsibility.

Examination by Inspection.—In the majority of cases, a mere glance at the patient will be sufficient to convince one that she is of normal configuration, and that her pelvis is probably all right. If she is a small woman, her pelvis may be small; but this does not necessarily follow, as many small women have normal pelvises. If there are indications of rickets, or deformity of the lower limbs or spine, from any cause, the pelvis will probably be affected. If the patient limps or waddles in walking, there probably is an abnormality in the pelvis. The rolling gait of congenital dislocations of the hips is very characteristic. A pendulous abdomen in a primipara is a very suspicious indication.

With the patient in bed, a fuller inspection can be carried out, and the external examination can be completed by measurements and palpation. By taking the intercrystal and interspinous diameters, you at once learn if there is any flattening of the pelvis. In a normal pelvis the intercrystal diameter should be about one inch longer than the interspinous. In a fair-sized pelvis the intercrystal diameter should be about 11 inches, and the interspinous one about 10 inches. Dr. Sanstein has shown that the transverse diameter at the brim is one-half the length of the intercrystal. If you find that the intercrystal and interspinous diameters are 9 and 8 inches or less, you would decide that the pelvis was a small one, a *justo-minor* pelvis. To take these diameters accurately, a pair of calipers is necessary, and in hospital they are at hand, but in private they are not often used. With a little experience you can soon learn by running the fingers

along the crests of the ilia, whether or not the curvature is normal. If the normal curvature is wanting, and the iliac crests are nearly straight, it is quite plain that there cannot be an inch difference between the two diameters, therefore the pelvis will be of the flattened type. With a pair of calipers, the external conjugate or Baudelocque's diameter may be taken. It is taken from the depression below the tip of the last lumbar vertebral spine to the centre of the symphysis pubis. It measures about $7\frac{1}{2}$ inches, and 3 inches have to be taken off for the thickness of the sacrum, and $\frac{1}{2}$ inch for the pubes. It is of very little importance, as it is impossible to estimate the exact thickness of the sacrum.

Inspection of the abdomen will reveal whether or not it is normal in size and shape. An extra large abdomen may mean a large child, a multiple pregnancy, hydramnios, or a tumour in addition to the pregnancy. A pendulous abdomen in a primipara generally means a contracted pelvis. If the uterine tumour is broadened and lying somewhat obliquely, a transverse presentation should be suspected.

Palpation of the Abdomen.—Much can be learned by palpation, and this procedure should always be adopted. The presentation and position of the child can be readily ascertained, the size of the child can be gauged, and also the size of the head, relatively to the brim of the pelvis. There are other points which can be learned by palpation, but the size of the head relatively to the size of the brim of the pelvis is the most important of all. If the head is not the presenting part of the child, it should be manipulated round, so as to bring it to the brim.

Palpation of the abdomen may be practised through a sheet or the nightdress of the patient, and with very sensitive patients it may be advisable to do it in this

way ; but it is preferable to place the hands upon the skin of the abdomen. The abdomen should be exposed only from the top of the pubic hair to the ensiform cartilage, so there is really no exposure of the genital organs. The patient lies flat on her back with the limbs extended. The attendant, whose hands should be perfectly clean and warm, stands at the right side of the



FIG. 1.—Palpating the presenting part.

bed, facing its foot ; he places both hands flat upon the lower part of the abdomen, with the tips of his fingers a little above Poupart's ligaments, and gradually sinks the tips of the fingers to grasp the presenting part of the child which lies at the pelvic brim. The head is easily recognized as a firm, globular mass, and if it can be easily moved from side to side, it is free above the brim. If the patient is a multipara, the head should be free above the brim, prior to the onset of labour, and even after labour has commenced ; but

with a primipara, the head should be more or less fixed in the brim at the onset of labour, and even for a week or two before. So, if the patient is a primipara, and the head is quite free above the brim at the onset of labour, there probably is a disproportion between the size of the head and the pelvic brim. By grasping the head with both hands, or with one hand, and pushing



FIG. 2.—Grasping the presenting head with one hand.

it downwards and backwards in the axis of the pelvic inlet, an estimate can be made as to whether or not the head will pass through the brim. If there is considerable overlapping of the pubis, it is quite evident that the head is too large to pass with safety to the child. In most of such cases the pelvis will be contracted, but this does not absolutely follow, as the disproportion may be caused by the large size of the head. Correctly to estimate the size of the pelvis relative to the head of the child, an internal examination will be

necessary. Before doing that, the uterus should be thoroughly palpated, by feeling with both hands, to make out how the back of the child is lying, and also the positions of the limbs. The smooth, rounded back should lie to one side, and the limbs to the other. If the back is well to the front, and the limbs are deeply placed, the position is an occipito-anterior one ; and if

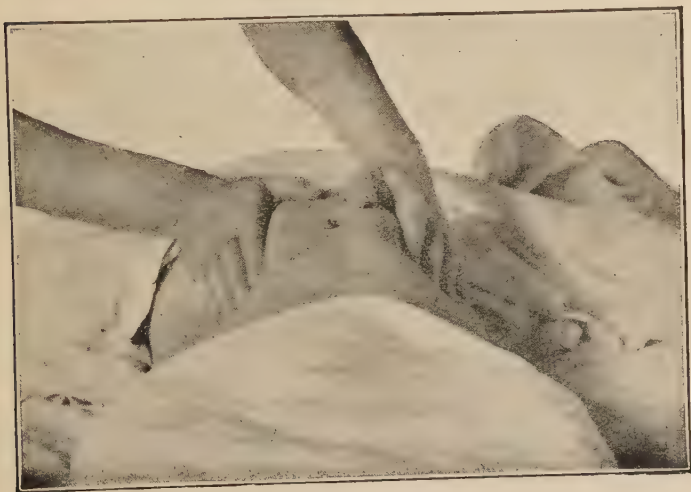


FIG. 3.—Palpating the back and limbs of the foetus.

the back is deeply placed, and the limbs easily felt to the front, it is an occipito-posterior position. The breech should finally be palpated at the fundus. It is not so rounded as the head, and it is continuous with the smooth back without there being any depression like a neck.

Internal Examination.—In many cases, a vaginal examination will not be necessary, but in all cases in which there are the slightest indications of obstruction, this examination should be done carefully, preferably

under an anæsthetic. The patient may lie on her left side with the knees well drawn up, or in the lithotomy position. The latter position is the better of the two for a thorough examination, and is the one to be used when testing the size of the head relative to the size of the pelvic brim. The patient's bowels and bladder should be empty, and the examination should be made

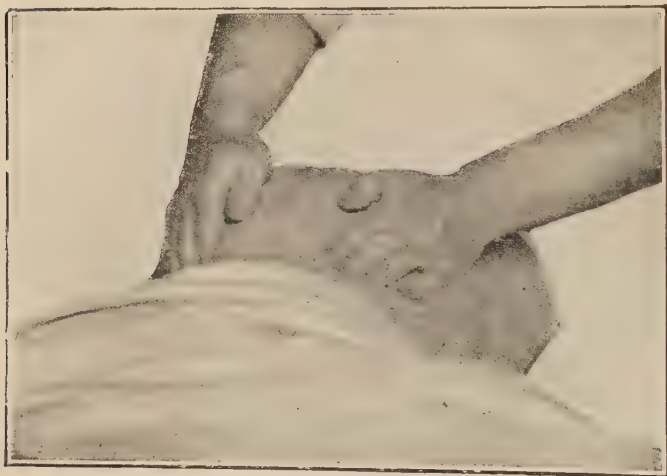


FIG. 4.—Palpating the part of the foetus at the fundus.

with aseptic precautions. The fore and middle fingers of the examining hand are passed into the vagina, and the promontory is sought for. If it can be reached with ease, the pelvis is a contracted one. The diagonal conjugate is taken, by placing the tip of the middle finger on the centre of the promontory, and then marking the position of the sub-pubic ligament on the edge of the hand by means of the forefinger of the other hand (Fig. 25). The distance from this point to the end of the finger which has been against the promontory

will give the diagonal conjugate. To get the true conjugate, it is necessary to subtract $\frac{1}{2}$ inch in a normal pelvis, and $\frac{3}{4}$ inch in a deformed pelvis, so that if the diagonal conjugate is 4 inches, the true conjugate will be $3\frac{1}{4}$ inch.

Various pelvimeters have been devised to measure the internal diameters of the pelvis, but none of them give more accurate results than the fingers, and one's fingers are always at hand. Undoubtedly the best pelvimeter is the head of the child. If the head will pass, it matters not how small the pelvis may be. More than once, I have seen labours end by natural effort, where the true conjugate was only $2\frac{3}{4}$ inches, because the children happened to have had narrow heads with bi-temporal diameters of $2\frac{1}{2}$ inches. In these cases, if I had taken into consideration only the size of the pelvis without considering the size of the head, I should have felt justified in doing a Cæsarean section, and with an ordinary-sized head this would have been the proper procedure; but by using the head as a pelvimeter, I was able to decide that a section was unnecessary.

As I have already said, you can often, by external palpation, form a pretty accurate estimate as to whether or not the head will pass the brim; but a more accurate estimate can be made by a combined internal and external examination. An anæsthetic should be used. With the patient in the lithotomy position, the fore and middle fingers of one hand are placed in the vagina, and the tips are pressed against the head. The head is grasped through the abdomen with the other hand, and it is pushed downwards and backwards into the brim, as firmly as possible. By the internal fingers you can at once estimate how far it is possible to push the head into the pelvis, and a little practice will soon

enable you to judge whether or not the head will come through the brim (Fig. 36). By pressing the thumb of the internal hand up over the symphysis it will be possible to estimate the amount of overlapping of the head. The hardness of the head can also be gauged by the internal fingers. This is of importance, because, if the head is a hard one, it will not mould, and this will render its passage much more difficult. A fairly large, soft head will pass with comparative ease, where a much smaller, hard one may be completely blocked. If the head cannot be made to enter the brim, the case is clearly one which is not suitable for delivery in the ordinary way, and you must come to a decision as to the proper method of procedure. If there is great disproportion, and the child is alive, Cæsarean section should be decided upon; but if the disproportion is not great, symphysiotomy or pubiotomy may be done. At present, I shall not attempt to deal with this question more fully, but shall leave it for consideration later on.

Besides estimating the diagonal conjugate, a thorough examination should be made of the other diameters of the pelvis, both at the brim and at the outlet, and also of the configuration of the pelvis; but these will be dealt with again. The point which I wish at present to emphasize is the importance of deciding, before labour sets in, whether or not there is likely to be difficulty in the delivery, so that the proper procedure may be adopted before the mother has become exhausted or the child's life endangered.

To be forewarned is to be forearmed.

CHAPTER II.

DELAY IN THE FIRST STAGE OF LABOUR.

It is usual to speak of three factors concerned in labour, viz. the **Powers**, the **Passenger**, and the **Passages**. If these three factors are all normal, no delay should arise. If one is abnormal, there will probably be delay, but it may not be of much consequence, unless the abnormality is great ; if two are abnormal, the difficulty will be great ; while if all three are abnormal, the obstruction may be complete. Complete obstruction may arise from an abnormality in one of the factors, but it is much more likely to arise when more than one factor is abnormal.

While we have three factors in labour, we also have three stages. If the factors are all normal, the stages will also be normal ; but if any of the factors are abnormal, one or more of the stages will be adversely affected. It will thus be seen that delay may be caused in many ways, and it may be present in any or all of the stages of labour.

Dilatation of the Birth Canal.—The birth canal consists of the lower uterine segment, the cervix, and the vagina. Dilatation begins a considerable time before actual labour sets in. During the last two or three weeks of pregnancy the cervix shortens, and its canal dilates, from above, so that it becomes continuous with the lower part of the uterine cavity. The lower part

of the uterine cavity also dilates. The shortening or taking up of the cervix is well seen in primiparæ. In these cases, the head of the child at the beginning of labour will be more or less in the pelvis, with the thinned cervix stretched over it. The apparent length of the cervix, measuring from the external os to the bag of membranes, may not be more than a $\frac{1}{4}$ inch. The external os is usually closed until actual labour sets in, but this is not always the case, even with primiparæ. In multiparæ, I have frequently seen it, for weeks before delivery, dilated sufficiently to allow the passage of two fingers. What may be called painless labour goes on for some time prior to what we know as actual labour, and in this way the lower uterine segment and the upper part of the cervix are dilated.

When labour sets in, the natural dilatation of the cervix is mainly brought about by the downward pressure of the uterine contents, caused by the uterine contractions, and especially by the contractions of the longitudinal fibres which pass up over the fundus. These fibres also tend to draw the lips of the cervix apart, and to pull the lower part of the canal up over the presenting part. As a rule, the circular fibres round the external os become inhibited, but, as we shall shortly see, this does not always happen. Gravity also assists, especially when the patient is going about. Over and above this we have a natural softening and relaxing of the parts, especially in the vagina. At the beginning of labour, the vaginal outlet may be quite narrow, especially in primiparæ, but long before the presenting part has reached the floor of the pelvis, great relaxation will have occurred, so that several fingers can be introduced with ease, causing less discomfort to the patient than one did at the onset of labour. This relaxation is due in part to the free flow of serum which takes

place, but there must also be inhibition of the sphincter muscle, probably from the pressure exerted higher up in the canal.

During the first stage of labour, dilatation of the cervix should progress steadily until it is fully accomplished, but in many cases there is considerable delay. The cause of the delay may lie in **the powers, the passages, or the passenger.**

Delay from faults in the Powers—Uterine Inertia.—

Of all the causes of delay in labour, uterine inertia is



FIG. 5.—A case of hydramnios at the eighth month.

by far the commonest. It may occur in any or all of the stages of labour, but it is much more common in the second and third stages than in the first. In the first stage, it may occur, if the uterus is over-distended by a multiple pregnancy or hydramnios, and it is sometimes seen in elderly primiparæ, and in multiparæ who have borne a large number of children. An abdominal tumour, or ascites, will also interfere with the contractions, as well as a loaded rectum, or distended bladder. A tumour, loaded rectum, or distended bladder will also interfere by direct obstruction.

The condition is not a very serious one, because, so long as the membranes are intact, there is no risk to the foetus, and very little to the mother, except from exhaustion. If the membranes are ruptured, there is some risk to both mother and child, if the uterine contents become septic. This is very liable to occur, if there is much delay. The chief risk is that the uterine inertia is likely to be continued throughout the second and third stages of labour, and in either of these stages, it is a much more serious complication, as we shall afterwards see.

Treatment.—In cases of over-distention, puncture the membranes, and allow some of the liquor amnii to drain away. In all cases, see that the bladder and bowel are empty. A hot bath is sometimes useful, or the application of hot stupes over the abdomen. In regard to drugs, quinine in 5-grain doses sometimes acts well by stimulating uterine action. Ergot should never be given. Chloral hydrate is, however, the best drug to use. It quiets uterine action for a time, and has a relaxing effect upon the cervix. Opium may be used for the same purpose. The treatment in cases of tumours will be dealt with later on.

Delay from faults in the Passage—Rigidity of the Cervix.—This may be simple, or due to disease. The best examples of the simple form are seen in primiparæ, especially elderly ones. In some, the cervix is thick, and dilates very slowly. With premature labours, we find much the same condition. In others, the external os is small, and the cervix very thin. In these latter, you will find that the os actually becomes contracted during the pains. This condition is known as **spasmodic rigidity of the cervix**, and is usually seen in primiparæ where there has been a very narrow os previous to impregnation—the so-called pinhole os. At the beginning

of labour the circular fibres round the os should be inhibited, but, in these cases, this has not occurred; their activity remains, and they contract spasmodically with the other muscular fibres of the uterus.

Treatment.—Give chloral or opium freely. The application of cocaine to the cervix has been very highly recommended, but I cannot say I have found it useful. A hot douche of lysol solution is sometimes very useful. If there is much delay, artificial dilatation should be resorted to by means of the fingers under an anæsthetic, or by the insertion of Champetier de Ribes' bag, if the membranes are ruptured. Bossi's dilator may be used, but, as a rule, it will not be required. For the methods of artificial dilatation of the cervical canal, see chapter xx., page 269.

Rigidity from an abnormal condition of the Cervix.—The cervix is sometimes thick and hard from old scars, from the result of an old inflammation, or from the application of strong caustics in the treatment of endocervicitis. The tissues are very hard, and dilatation is therefore slow and difficult. After amputation of the vaginal portion of the cervix, the cicatricial contraction may be so great as to nearly occlude the os.

Treatment.—Chloral and opium are not of much use, and artificial dilatation will probably be necessary. In some cases, it will be necessary to incise the cervix in the way described on page 277.

Hypertrophy of the Cervix.—The vaginal portion of the cervix is sometimes so elongated as to protrude at the vulva. It may be associated with prolapse of the uterus. The membranes are likely to rupture early, and dilatation is sure to be slow.

Treatment.—Artificial dilatation will be necessary. Bags may be used, but manual dilatation under an anæsthetic is the best method. If the cervix is very

dense, amputation may be necessary. When delivering through the elongated cervix, care must be taken to support and gradually push it above the presenting part, otherwise the whole uterus may be dragged down.

Malignant disease of the Cervix.—One would imagine that, if cancer of the cervix were present to any extent, conception would be prevented, and this probably is the case; but I have seen a fair number of cases of labour where there was cancer of the cervix present, to such an extent, that there was little or no hope of curing the patient by removal of the uterus. The disease seems to advance very rapidly during pregnancy.

If the cervix is much infiltrated and hard, the dilatation will be very slow. When the tissues are friable, there may be considerable bleeding, but dilatation will not be hindered. Occasionally, the mass is so large, that delivery through the natural passages is quite impossible.

Prognosis.—In regard to the mother, the hopes of cure by removal of the uterus are exceedingly small, if the cervix is much involved. In regard to the child, if it is alive, the method of delivery should be adopted which will give it the best chance of surviving. If the child can be delivered through the natural passages without endangering its life, provided there is no immediate risk of the mother's life, this should be done, and if the case is an operable one, then the uterus can be removed through the vagina; but if there is likely to be any risk to the child, during delivery through the natural passages, it is preferable to deliver it through the abdomen by abdominal section, and then to remove the uterus. The child will thus have a better chance, and the risk to the mother will not be materially increased. If there has been considerable hæmorrhage, even if the case should be an inoperable one, the best

method to adopt is to do an abdominal section and remove the uterus supravaginally. By this procedure the child's life can be saved, and the bleeding will be controlled, and although the mother will not be cured, her life will be prolonged, as the growth of the tumour will be retarded by the blood supply being cut off when the uterine arteries are tied and cut.

Malposition of the Uterus, such as is seen when the abdomen is pendulous, will cause delay, as the presenting part is not driven downwards, but backwards against the promontory. A lateral deviation of the uterus will also cause delay, and we see the same thing with a double uterus. In the latter, the uterine contractions are also likely to be weak, from the muscular fibres not being properly developed.

If **vaginal fixation**, or **ventro-fixation**, of the uterus has been done, in some cases the fundus is prevented from rising, and the upward growth of the posterior wall of the uterus drags the cervix up until the os lies above the promontory. The uterus is thus extremely anteflexed, and during labour the presenting part is driven against the promontory, and not into the brim. Dilatation is very seriously interfered with. The membranes are likely to rupture early, and the uterus then becomes retracted round the child, and rupture may occur. The presentation is generally abnormal (Fig. 6).

Vaginal fixation is now seldom done, but **ventro-fixation** is a very common operation. In many cases of ventro-fixation dilatation is not interfered with, but in these the fixation of the fundus is not firm, or else the anterior wall and not the fundus is fixed. If the fundus is left free, its upward growth will not be interfered with. The fundus should never be fixed firmly, if the woman is likely to become pregnant.

Treatment.—If the uterus is movable, correct the

deviation and apply a firm binder. Hook one or two fingers into the os, and draw it to the centre of the pelvic canal. When the uterus is fixed, and the os is drawn high above the promontory, dilatation may occur naturally, if the membranes remain intact, or you may

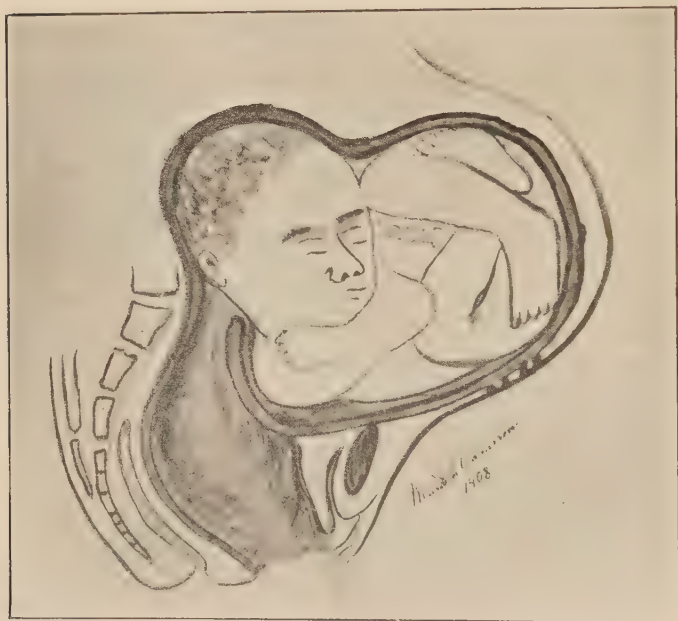


FIG. 6.—A case of ventro-fixation. From a drawing by Prof. M. Cameron.

be able to dilate by means of hydrostatic bags, or manually, and deliver through the natural passages ; but it is preferable to do a Cæsarean section in the interest of both mother and child. If the uterus is retracted round the child, as in Fig. 6, Cæsarean section should be done. Even with a dead child, it would probably be safer for the mother than a destructive

operation. The patient should be sterilized, and if the uterus was infected, hysterectomy should be done.

Occlusion of the Os Uteri.—The os may be completely occluded. It is a rare condition, but I have seen at least six cases. It is probably the result of adhesive inflammation.

Diagnosis.—A careful examination will reveal that the presenting part is covered by a smooth membrane, which is continuous all round with the vaginal mucous membrane. No os can be found, but sometimes a depression can be felt, indicating the position of the os. A careful search must be made for the os, because, occasionally, in extreme anteflexion of the uterus, such as is present in cases of ventro-fixation, the os is drawn far up posteriorly, and the anterior portion of the cervix is stretched over the presenting part (Fig. 6). This gives exactly the same appearance as with occlusion, so care must be exercised to diagnose between the two.

Prognosis.—There is no particular risk, if the condition is recognized and properly treated, but, if it were neglected, the uterus might rupture, or, what is more probable, the cervix might be torn off in front of the presenting part.

Treatment.—Scratch through where the os should be, or make a crucial incision. Dilatation may then be left to nature, but I prefer to dilate manually and deliver immediately. There is not usually much bleeding from the cervix, but if there should be, stitches should be inserted. I have never found this necessary. In all of my cases, the appearance of the cervix at the end of the puerperium has been similar to that of a woman who has passed through an ordinary labour.

A Contracted Pelvis will cause Slow Dilatation.—Malpresentations and malpositions are common, and

the bag of membranes often protrudes in a sausage shape and ruptures early.

Treatment.—If the membranes have not ruptured, keep them intact as long as possible. If they have ruptured, and the presenting part cannot descend, artificial means of dilatation should be adopted, provided delivery is to be effected through the vagina. The dilating bags are most useful, but manual dilatation will frequently be necessary.

This condition will be fully dealt with when considering contracted pelvises.

Delay from faults in the Passenger—Small amount of Liquor Amnii.—In such a case, there are no forewaters, and the membranes are closely applied to the presenting parts. The same condition arises, when the membranes rupture at the commencement of labour, or before the uterus begins to contract. The bag of membranes not only acts as a mechanical dilator, but also, by its pressure through the os, reflexly stimulates uterine contractions, so the want of it is of considerable disadvantage.

Treatment.—With a small amount of liquor amnii and unruptured membranes, patience will be required. The patient's strength should be supported, and she may be given chloral or opium in full doses to relax the cervix. It is sometimes useful to rupture the membranes when the os is about half dilated, to allow the presenting part to bear directly on the cervix.

Early Rupture of the Membranes is often associated with a malpresentation, but these cases will be dealt with under malpresentations. At present, we shall deal with cases where the head or breech presents, and there is no obstruction. The presenting part acts fairly well as a dilator, if the pains are good, and one may wait patiently, so long as the pressure upon the child is not

acting injuriously on it. If the pains are inefficient, chloral or opium may be used. A close watch must be kept on the foetal heart, and if it begins to show irregularity, or much slowing or quickening, artificial means of dilatation must be adopted. Barnes', or Champetier de Ribes' bag may be used, especially when the os will only admit two fingers, but manual dilatation under chloroform is the quickest method. If the cervix is rigid, and it is evident that the child is suffering very much, a number of incisions should be made through the cervix, and this will allow of quick dilatation. Some authorities advise the application of the forceps when the os will admit four fingers. This may be done, provided delivery is very slowly effected, but there is considerable risk of tearing the cervix badly, if the operation is done hastily. Personally, I prefer to dilate the cervix to as near its full extent as possible, before applying the instruments. If the cervix is in a condition to admit of delivery, you will have no difficulty in dilating it with your hand, when the patient is under chloroform, and, if you cannot do it with your hand, the forceps should not be applied, or you will be sure to cause a bad tear. In such a case, it is far better to incise in different directions, and then dilate before delivering. Bossi's dilator may be used instead of incisions, but it must be used with great care.

When the membranes rupture before the onset of labour, and several days elapse before delivery, the small amount of liquor amnii remaining in the uterus may become very foul from infection from the vagina. The patient's temperature will rise, and this should be taken as an indication for interference.

Adhesion of the Membranes.—At the commencement of labour, the membranes in the lower part of the uterus become separated, and the bag of forewaters is pressed

into the cervical canal, but in some cases, the membranes are so adherent that the bag cannot come down, and dilatation is thus delayed.

Treatment.—Pass a finger in and sweep it round, and separate the membranes as high up as you can reach. This will allow the usual bag to form, and probably there will be no more difficulty.

Delay from Malpositions, Malpresentations, and Deformities of the Fœtus.—In all of these the presenting part does not, as a rule, fit well in the brim, and, as a consequence, the membranes usually project in a sausage shape and rupture early.

Treatment.—Keep the membranes intact as long as possible. If they rupture early, insert a Champetier de Ribes', or a Barnes' bag, and finish the dilatation manually, if necessary. These cases will be more fully dealt with later, in discussing the methods of treatment of abnormal cases.

CHAPTER III.

DELAY IN THE SECOND STAGE OF LABOUR.

THE normal second stage of labour begins when the os is fully dilated and the membranes rupture. It may only last a few minutes, or it may be prolonged for many hours. Under ordinary conditions, one may say that there is very little danger in the first stage, either to mother or child, provided the membranes are unruptured ; but, in the second stage, the danger to both is much increased. In the great majority of cases, however, if the second stage is not unduly prolonged, neither mother nor child will suffer any harm. It is exceedingly difficult to make any definite statement as to what ought to be considered a normal second stage, as regards length. What is perfectly safe in one case, may be exceedingly dangerous in another. Each case must, therefore, be judged upon its own merits, and prompt assistance must be rendered as soon as it is necessary, in the interest of either mother or child. The interests of the mother are, of course, paramount, but it must not be forgotten that the unborn babe, too, has rights, which should be considered. In many cases, interference is clearly called for, either in the interests of the mother or of the child, but there are others of simple inertia uteri, where there is no immediate danger to either mother or child. In these latter, should one wait in-

definitely, or only for a stated time? Some authorities advise leaving such cases to nature, until the woman begins to show indications of exhaustion, by the temperature rising, and the pulse quickening. I cannot agree with this. Statistics show, that in labours lasting over twenty-four hours, the mortality is four times greater than in those under twenty-four hours, while in those lasting over thirty hours, it is twelve times greater. If the first stage has been a prolonged one, the second stage should not be allowed to drag on indefinitely. In such a case, if natural delivery is not likely to occur shortly after four hours of a second stage, I think artificial delivery should be employed. In cases of contracted pelves, a longer second stage may be advisable to allow of moulding, but, at present, I am referring to ordinary cases of delay in the second stage, from uterine inertia. Each case must be judged on its own merits, but I consider this a reasonable time to wait on nature. If delivery is effected with proper care, there will not be any added risk, and the woman will be saved considerable suffering. There are many cases in which we are called upon to interfere much sooner, but with these we shall deal in their proper places.

Failure in the Primary Powers—Uterine Inertia.—We shall now consider the causes of delay from failure in the powers. The primary powers are the uterine contractions, and the secondary the contractions of the abdominal muscles. Failure in the primary powers, or *uterine inertia*, is the commonest of all causes of delay in the second stage. The uterine muscle, like any other muscle, can only do a certain amount of work, and, if it is overtaxed, failure in the contractions must occur. If the muscle is in a strong, healthy condition, and the uterus is not over-distended, inertia will not occur for a considerable time, but in a case where there is

weakness in the uterine wall from disease or overwork, as in cases of frequent and rapid child-bearing, or where the wall is overstretched by hydramnios or a multiple pregnancy, inertia will supervene early in the second stage. Again, if the first stage has been unduly prolonged, the contractile power will to a large extent be used up, and the uterus be unfit for any more work until it has had a rest. In patients who are constitutionally weak, the uterus may partake in the general weakness of the muscular system, but this is not invariably the case. For instance, in phthisis, I have seen a number of advanced cases where the uterine contractions were quite strong, and the labour exceptionally easy and quick. In such cases, the child is apt to be small, and the emaciation of the patient also allows of an easy passage.

When the contractions are weak and sluggish from the beginning, the condition is known as one of *primary uterine inertia*, but when they have become weak after a period of strong activity, the term *secondary uterine inertia* is used.

Irregular Uterine Contractions.—Irregular uterine contractions may arise from disease of the uterine wall, from exhaustion, or from the irritation of too frequent examinations. A full rectum or bladder will also cause them reflexly. They cause excessive suffering, and have practically no effect in advancing the labour.

In a properly conducted labour, except where there is disease of the uterine wall, these irregular contractions should not arise. It is surprising, however, how often an over-distended bladder is overlooked.

Failure in the Secondary Powers.—In cases of chest disease, the patient may not be able to fix her diaphragm, and she will thus be prevented from bearing down. If the abdominal muscles have been overstretched, as by

frequent pregnancies, they will not contract well. Separation of the recti muscles gives rise to much the same condition, as the uterus falls forwards between the muscles, and is not compressed by them. This condition is common after an abdominal section, but is often seen in cases where there has been no section. I have seen it in a primipara. In such cases, in addition to the failure of the secondary powers, the abnormal position of the uterine axis hampers the action of the primary powers. The child is not driven into the brim, but against the posterior wall. Over-distention of the abdomen from ascites, a tumour, or even a full bladder, will hamper the action of the secondary as well as the primary powers. If peritonitis be present, the pain will prevent the secondary powers acting.

Hemiplegia, or even paraplegia, as a rule, does not affect the primary powers, but the secondary powers will be more or less weakened.

The loss of one or both legs will interfere with the secondary powers, as the patient will not be able to bear down strongly.

Treatment.—Remove the cause, if possible, and wait on nature a reasonable time, but not indefinitely. The primary powers may be stimulated by hot stupes to the abdomen, or by massaging the uterus. Ergot should not be given, but quinine is sometimes useful. In secondary inertia, sugar is said to tone up the exhausted uterus quickly, but I cannot speak from experience. Posturing the patient is sometimes useful. When the patient lies on her left side, or even on her back, her secondary powers cannot be used to their best advantage in expelling the uterine contents. The kneeling, or squatting, postures allow of the secondary powers being used to the greatest advantage. These are the postures which primitive women often assume by instinct during

delivery. If the patient is strong enough, one or other of these postures should be tried. A tight abdominal binder will assist. In many cases, artificial delivery will be necessary by forceps, when the head presents, or by traction, if it is a breech case. Care must be taken to guard against post-partum hæmorrhage, by delivering very slowly, and by keeping the uterus compressed as the child is withdrawn from it. The third stage must be conducted with great care.

Delay from Deviation of the Uterine Axis.—This condition has already been dealt with in connection with delay in the first stage of labour. If the deviation cannot be corrected, artificial delivery will be necessary. If it is merely a case of a pendulous abdomen, a very firm binder may be all that is necessary. The patient should lie on her back. When the fundus of the uterus is fixed down, Cæsarean section will probably be required. When there is a deviation of the uterine axis, an abnormal presentation is very likely to occur. For a fuller discussion of this subject, see page 17.

Delay from Faults in the Soft Passages.—If the cervix is elongated, delay will be caused. In the first place, it will not dilate well, and the membranes are apt to rupture early, thus giving a long first stage, which will probably lead to inertia in the second stage. When full dilatation has occurred, the cervix will not have disappeared as in an ordinary case, but there will be a considerable channel through which the presenting part must pass. Considerable resistance will be encountered, and the labour will be slow.

Treatment.—When nature fails, deliver artificially. Do the operation slowly, to prevent laceration. There will frequently be a tendency for the whole uterus to prolapse, so the cervix must be supported and pushed above the presenting part during delivery. In some

cases, it may be necessary to amputate the cervix before delivery.

Impaction of the Anterior Lip of the Cervix.—In these cases, the anterior lip of the cervix is somewhat elongated, and it gets nipped between the head and the symphysis pubis. It quickly becomes œdematous from the pressure, and may protrude at the vulva.

Treatment.—Support the swollen lip, and press it up over the presenting part, especially between the pains.

Prolapse of the Vagina and Cystocele.—A very lax vaginal wall will obstruct by being prolapsed before the presenting part. The anterior wall is the one which gives most trouble. Along with it the bladder prolapses, causing a cystocele, and this may seriously obstruct, if there is much urine in the prolapsed portion of the bladder.

Treatment.—Empty the bladder and push the prolapsed portion above the presenting part between the pains, and keep it up during the pains.

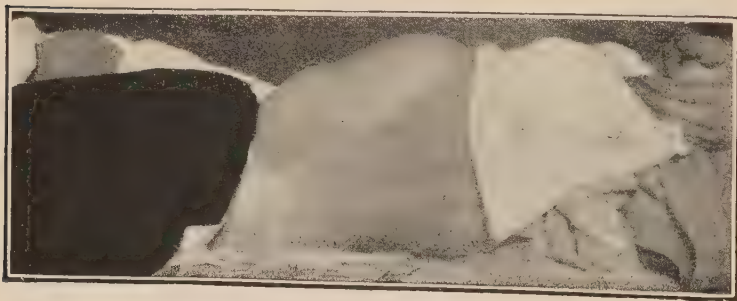


FIG. 7.—Distended bladder.

Distention of the Bladder or Rectum has already been referred to as causing irregular contractions and interfering with the action of the secondary powers. A tumour in the rectum or bladder, or a vesical calculus,

would have the same effect. Besides the effect on the contractions, there would be direct blocking.

Treatment.—Empty the bladder or rectum. There will probably be some difficulty in passing a catheter, but this can be done, in the interval between two pains, by pushing the presenting part up. A tumour or calculus should be removed, if it obstructs.

Rigidity of the Vagina and Perineum.—This is usually seen in primiparæ, especially in elderly ones.

Treatment.—Hot sitz-baths and hot vaginal douches assist relaxation. If an antiseptic is used in the douche, it must not be corrosive sublimate, or more harm than good will be done. Lysol makes the best douche, as it lubricates the passage. Hot fomentations to the perineum are useful. When the perineum is very rigid, incisions are sometimes made at each side of the vulva, but I do not approve of them. I prefer putting the patient deeply under chloroform, and delivering the head slowly with forceps, after the parts have been thoroughly stretched by the hand. In this way the perineum can often be saved. If it does tear it should be stitched at once.

Method of Supporting the Perineum.—In a natural delivery, if there is any rigidity, the perineum is likely to tear. In order to prevent this, the head should not be allowed to be expelled too quickly, and it should be kept as much flexed as possible, to bring it through in its smallest diameter. A pledget of absorbent wool, wrung out of lysol solution, should first be placed over the anus, to prevent the hand being soiled, then lay the right hand flat over this, with the fingers on one side of the vulva and the thumb on the other, and push the whole structure forwards, in the direction the head is passing. At the same time, the left hand should be passed between the thighs from the front,

so as to keep the head flexed as much as possible, and to retard its too rapid advance. The tips of the fingers



FIG. 8.—Supporting the perineum, flexing and retarding the advance of the head.

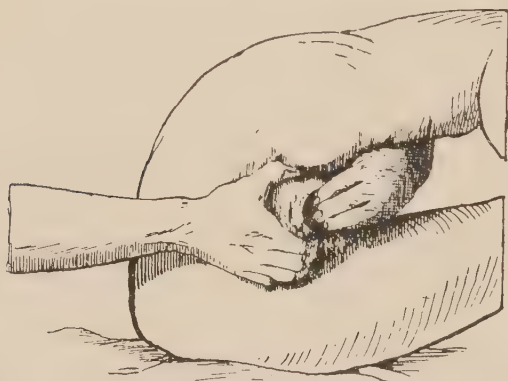


FIG. 9.—Further stage of supporting the perineum.

are pressed against the part of the head in front of the posterior commissure at first (Figs. 8 and 9), and, finally,

the head is grasped, with the thumb behind the symphysis (Fig. 10). The perineum should not be stripped back over the forehead, as this is sure to tear it. The more the head is flexed, the smaller its diameter will be, and the less the strain on the perineum. Supporting the perineum is a somewhat misleading term, as, strictly speaking, retarding and flexing the head is principally what is done. In delivering with forceps to save the



FIG. 10.—Final stage, flexing the head by grasping it.

perineum, the final part of the delivery must be done very slowly, and the patient should be kept deeply under the anæsthetic, to prevent her bearing down.

Cicatricial Contraction of the Vagina.—This is occasionally seen as the result of former tears or ulcers. The contraction may be so great as almost to close the passage. As labour goes on, softening and relaxation occurs, and in some cases the obstruction disappears.

Treatment.—If the constriction persists, and the canal

cannot be dilated with the hand, a number of incisions should be made through the band. Delivery may be left to nature, but if there is delay, forceps should be used. If necessary, the parts should be stitched after delivery.

Persistent Hymen.—As a sign of virginity, the presence of the hymen is of little value, as it is occasionally found present at the time of labour, even in a married woman who has had intercourse frequently. I have seen one case where a very strong fleshy hymen, with two small openings in it, obstructed delivery. On tearing it through, the bleeding was so profuse from spouting arteries, that it was necessary to tie the vessels.

Treatment.—In all probability the descending head will tear through the obstruction, but it should be ruptured with the fingers.

Vaginismus.—In ordinary cases, the vagina relaxes before direct pressure is brought to bear on it by the advancing head, but, in cases of bad vaginismus, the spasmodic condition persists, just as it occasionally does in the cervix in the first stage of labour. It will be impossible to examine the patient vaginally without an anæsthetic.

Treatment.—Give the patient an anæsthetic early in labour, and dilate the vagina very thoroughly with your hand, in order to overcome the spasm ; then wait for a reasonable time, and if there is undue delay, deliver with forceps under an anæsthetic. The stretching of the parts during delivery will cure the condition.

Tumours of the Vagina and Vulva.—Solid tumours are sometimes found in the vaginal wall, but cystic ones are much more common. I have seen a case of a cavernous angioma on the posterior vaginal wall the size of a small orange. When it was removed the bleeding was excessive, but was controlled by stitching and firm plugging. At the vulva the obstruction may

be due to a hæmatoma, a cystic condition of Bartholin's glands, and sometimes you meet with venereal warts forming a tumour as large as a small cauliflower, and not unlike it in appearance. When Bartholin's glands are suppurating, the condition is generally due to gonorrhœa, and there is very great risk of the patient subsequently developing puerperal sepsis. With venereal warts there is the same danger, but, as the warts are external, the risk is not so great. The greatest care should be exercised in dealing with such cases.

Treatment.—Solid tumours should be removed, and, if practicable, cysts also. The latter may be incised to evacuate the contents, but, if there is pus in them, they should be dissected out without opening into them, if this can possibly be done. Suppurating Bartholin's glands should be dissected out, and not merely incised. After the child is delivered, the parts should be stitched. Plugging may be resorted to, but stitching is preferable. A hæmatoma should be incised, and the clot evacuated, and, as soon as the child is delivered, the part should be stitched with catgut from the bottom, so as to completely close the cavity. Venereal warts should be cleansed as thoroughly as possible, and then removed by snipping them off with scissors, and stitching the parts with catgut. The worst case of venereal warts with which I have had to deal was complicated with placenta prævia. The mass was as large as a small cauliflower, and it was extremely septic. I removed the warts after cleansing them, and then delivered the patient by version. Contrary to my expectations, the patient did not become septic, and all the incisions, except those round the anus, healed by first intention.

Venereal sores.—Soft and hard chancres are occasionally met with. They, of course, will not cause delay, but they are a source of danger to the patient and the

obstetrician. The soft ones are the most dangerous to the patient from the point of view of puerperal sepsis, while the hard ones are the most to be dreaded by the obstetrician, as he may contract syphilis from them.

In dealing with such cases, the attendant should protect himself or herself by wearing rubber gloves. Where sores are apparent, they should be thoroughly cleansed with an antiseptic solution, and swabbed all over with pure carbolic acid. It is surprising how seldom such patients become septic. The probability is that they have become immune. In syphilitic cases, it is the attendant who runs the most risk, if he or she should have a break in the skin of the hand.

Tumours of the Uterus.—Fibroid tumours are the ones most frequently met with. The submucous variety generally prevents conception, but pregnancy is fairly often found in cases of the interstitial or subperitoneal varieties. The pregnancy may be interrupted, but this does not occur with very much more frequency than in ordinary cases.

There may be only one tumour, but several may be present, and they may be of different varieties. They are likely to grow rapidly during the pregnancy from the increased blood supply, and the patient may suffer from pressure symptoms. In some cases they become œdematous, and occasionally a degenerative change occurs in the tumour substance in the form of red necrosis. After delivery, suppuration may take place, and the tumour become gangrenous, especially if it has been bruised during delivery. With small tumours, or even with fairly large ones, the pregnancy may be quite normal, but with a pedunculated subserous one there is always a risk of twisting of the pedicle.

The effect upon the labour will depend upon the position, size, and consistence of the tumour. I have

put the position first, as it is of the most importance as regards obstruction. A fairly large tumour may be of little importance as regards obstruction, provided it

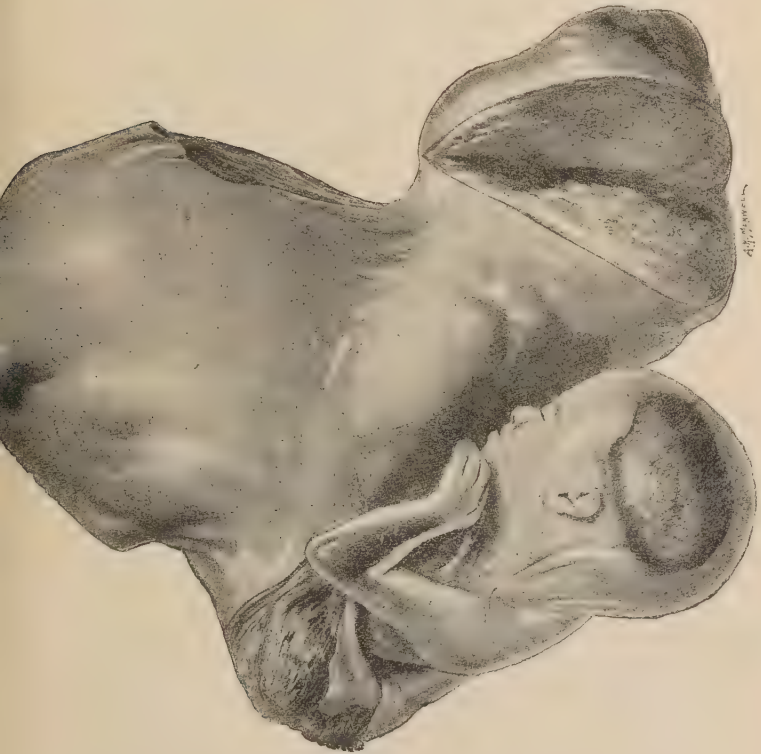


FIG. 11.—Specimen of a subperitoneal fibro-myoma, which projected into the pelvic cavity from the posterior wall of a gravid uterus. The head and arms of the fœtus were expelled from the cervical canal after removal of the uterus and tumour. (Block lent by Dr. Sam. Cameron.)

is high up, whereas a small one which is low down may completely block the entrance to the brim of the pelvis. In this connection, it must be borne in mind that a tumour of fair size, which early in pregnancy

blocks the entrance to the brim, may be drawn up out of the way at full time, and allow of delivery through the natural passages without any serious operation being



Cervical canal.

FIG. 12.—Specimen of a subperitoneal cervical fibro-myoma, which produced severe pressure symptoms when the uterus became gravid. Hysterectomy was performed at the fifth month. (Block lent by Dr. Sam. Cameron.)

necessary. If the tumour is attached low down, even although it may not be very large, it will obstruct the labour, unless it is sufficiently movable to allow of its being pushed above the brim of the pelvis. A fairly large tumour attached high up may not seriously obstruct

labour by actual blocking, but it will interfere with the uterine contractions, and probably so displace the uterus as to cause a deviation in the uterine axis, and thus prevent the presenting part from entering the rim. In such a case, an abnormal presentation is very likely to occur, and if it does, the difficulty will be increased.

When the tumour is high up, the first stage of labour is usually prolonged, from deviation of the uterine axis, and want of proper uterine contractions. When it is low down, dilatation may be prevented. However, it is usually in the second stage that the most serious difficulty arises. In the third stage, the chorion is often adherent, and there is greater risk of post-partum hæmorrhage than in an ordinary case.

Diagnosis.—In many cases, the presence of the tumour or tumours may have been recognized before impregnation. It will be easy to make out one or more hard masses connected with the uterus. If the tumour is low down, it will be felt *per vaginam*, distinct from the presenting part. An ovarian dermoid will give much the same feel through the vagina, but it will not be so firm, nor so closely connected with the uterus, unless it is adherent. The differential diagnosis between the two conditions is of little importance, as the treatment of both conditions is the same. I have seen a case of extra-uterine gestation, which had gone on to near full time, which was supposed to be fibroids, complicating an ordinary pregnancy. There was a firm swelling in the pelvic cavity, which felt like a fibroid, but it turned out to be the body of the uterus jammed down, while one or two hard masses in the abdomen were really parts of the foetus. The history did not point to an extra-uterine gestation.

Prognosis.—During pregnancy, if the tumour is large, pressure symptoms will supervene, and these may be-

come so bad that an operation will be necessary ; but, in many cases, the pregnancy will run an ordinary course. It is during labour that the most risk is incurred. If the tumour is low down, and cannot be pushed up, the condition is a serious one, and probably will necessitate an abdominal operation ; but if it is high up, unless it be a large one, it may not have much influence upon the labour. In the third stage of labour there is more risk than in an ordinary case. If the tumour should be bruised during labour, sepsis is apt to supervene in the puerperium, and the condition will then become very grave.

In regard to the child, the risk to it will depend upon the amount of obstruction, the length of the labour, and the method of delivery adopted. If abdominal section is necessary, there should be no risk to the child, provided the operation is done early. The risk to the child is much greater in cases of partial obstruction, in which delivery is effected through the natural passages, than in those of greater obstruction, in which abdominal section is resorted to in good time. In all cases in which there is much delay, no matter which method of delivery is adopted, the risk to the child will be greatly increased.

Treatment.—During pregnancy, a subperitoneal, or even an interstitial, fibroid may be removed without interfering with the pregnancy, but this is not advisable, unless there are indications calling for operation, such as pressure symptoms, or twisting of the pedicle in a subperitoneal tumour. To remove a tumour during pregnancy, because it is feared it will obstruct during labour, is a mistake. Even when the tumour is low down, it is often drawn up out of the way as pregnancy advances, so that, at full time, it no longer forms an obstruction. Another objection against operating during pregnancy, unless absolutely forced to do so, is, that the uterus

may expel its contents, when the child will certainly be sacrificed, if it has not reached a viable age. Even if it has reached that age, its chances of surviving are not nearly so good as at full time. To the mother, the risk



FIG. 13.—A fibroid tumour which filled the pelvis, and completely obstructed labour.

of operation at full time should not be any greater than during the pregnancy, provided she is in as good a condition.

When an operation is necessary, either during pregnancy or labour, where it is at all possible the tumour or tumours should be removed and the uterus left.

With multiple tumours this will not be possible, and a hysterectomy will be necessary.

During labour, the treatment to be adopted depends upon the situation and size of the tumour. With small tumours situated high in the uterine wall, it is seldom that a severer operation than forceps or turning will be necessary, and, in some cases, natural delivery will occur. In such cases, allow the labour to go on in the ordinary way, and only interfere if it becomes prolonged. Fairly large tumours, attached high up, may not cause much trouble, unless they have grown downwards, so as to obstruct the brim, partially or wholly. If they cause deviation of the uterine axis, dilatation will be interfered with, and it may be necessary to dilate the cervical canal artificially, and to deliver by forceps or turning. The difficult cases are those in which the tumour or tumours are attached low down, or have grown downwards, or slipped down, so that they partially or entirely obstruct the pelvic inlet. If the tumour is movable, it may be possible to push it up out of the way with the patient in the knee-elbow position, or in Trendelenburg's position. Delivery can then be effected by forceps or turning. If the tumour is immovable, delivery by the natural passages should not be attempted, unless there is sufficient room to allow of the passage of the child, without much pressure upon the tumour. If the child is dead, craniotomy should be done, if there is room for the diminished head to pass, without undue pressure. Where it is quite evident that the child cannot be delivered without exerting undue pressure, and it is alive, an abdominal section should be done at once. When the child is removed from the uterus, it is usually necessary to remove the uterus along with the tumour, either by supra-vaginal amputation, or by panhysterectomy, but if it is possible

to remove the tumour and leave the uterus, this should be done. With subperitoneal fibroids this is much more likely to be possible than with interstitial ones. The uterine incision should be stitched as in an ordinary Cæsarean section. In a case of complete obstruction, no matter whether the child be dead or alive, the abdominal operation is the only feasible one. In cases of complete obstruction there is no difficulty in deciding what should be done, as there is no alternative to abdominal section, but in partial obstruction there is an alternative to the section, and these are the cases in which it is difficult to decide as to which is the better method to adopt. If there is any doubt as to whether or not the pressure upon the tumour, during delivery through the natural passages, may damage it, do not hesitate to decide upon the section. If the tumour should be injured during delivery, and an operation be necessary during the puerperium, the risk to the woman will be enormously increased. In all cases in which abdominal section is necessary, the operation should be done before, or as soon as possible after, the onset of labour, as the sooner it is done, the less the risk to both mother and child.

The method of operating will be described in connection with Cæsarean section.

When delivery is effected by the natural passages, post-partum hæmorrhage must be guarded against. Care must be taken to see that the whole of the chorion comes away, as it is not unlikely to be adherent. If there is any septic absorption during the puerperium, especially if the tumour has been bruised, the outlook for the patient will be serious. In such a case, total extirpation of the uterus and tumour will probably be called for, and it should be done as soon as possible.

No mention has been made of the induction of

abortion or premature labour in these cases. I am not in favour of either of these operations in such cases, unless under very exceptional circumstances, where it would be impossible to adopt the more radical procedures just described.

Malignant Tumours.—A malignant tumour of the body of the uterus will prevent conception, or if conception should occur, an early abortion will be sure to result. A malignant growth in the cervix is, however, not very uncommon, and it may prove a very serious obstruction. I have already dealt with this condition in connection with delay in the first stage of labour, and need add nothing further.

Ovarian Tumours.—These may be cystic or solid. The cystic are the much commoner, and they may be uni- or multilocular. In my experience dermoid cysts are the ones most frequently met with, and they are the ones most likely to cause obstruction, as they are generally below the brim, in part at least, and often adherent. An ordinary multilocular one may grow to a large size, and yet not obstruct the labour. I have removed a cyst, three days after delivery, which contained seven pints of fluid. It had not obstructed the delivery. It is the medium-sized ones which give most trouble, as the pedicle allows them to be pushed down in front of the presenting part. Twisting of the pedicle is liable to occur during pregnancy, and especially during labour, and this may lead to very serious results, if the tumour is not promptly removed before necrosis sets in.

Just as with uterine tumours, the amount of obstruction will depend upon the position, size, and consistence of the mass. Large tumours will be high up in the abdomen, and they will not directly obstruct, unless a portion lies below the brim, but they will interfere with the uterine contractions, and cause a deviation

of the uterine axis. When the tumour is prolapsed entirely or partly, below the pelvic brim, even if comparatively small, it may block the inlet, and not only prevent dilatation of the cervix, but also the passage of the child. Besides the twisting of the pedicle, the tumour may be so injured by pressure as, afterwards, to become gangrenous, or it may rupture, and in a few rare cases, especially of dermoids, it has been forced through the posterior fornix, and expelled at the time of labour.

Diagnosis.—If the tumour is large, the abdomen will be very much distended, and the condition may be mistaken for a multiple pregnancy, or hydramnios. By careful palpation, one should be able to make out the tumour separate from the uterus. There should be no difficulty in making out a fairly small tumour, if it is abdominal, as it will be felt to be movable, and quite separate from the uterus. When it is wholly or partly prolapsed into the pelvis, it will be easily felt by the vagina, as a more or less cystic mass, blocking the inlet. Dermoids, or solid tumours, are difficult to distinguish from uterine fibroids. The dermoids are more or less doughy to the feel, but a uterine fibroid may become œdematous, and it then has the same feel. If a mistake is made, it is of no consequence, as the treatment is the same in both cases.

Prognosis.—There is risk during pregnancy of twisting of the pedicle. In the majority of the cases the pregnancy runs a normal course, but, if the tumour is large, the increased abdominal pressure will cause discomfort. The risk during labour is considerably greater than in an ordinary case, and will be much the same as with a fibroid tumour.

Treatment.—If the tumour is discovered early in pregnancy, it should be removed at once, even although it is small, as the risk of twisting of the pedicle is con-

siderable. If this accident should happen, immediate operation is called for. If the tumour is not discovered until within a few weeks of full time, it would be well to wait for full time, unless, of course, there should be indications calling for immediate operation. If the operation is done shortly before full time, there will not be sufficient time for the abdominal wound to become consolidated before labour comes on, and it will probably yield.

In cases where full time has been reached and labour has come on, one must pursue much the same course as with tumours of the uterus itself. If the tumour is high up, no great difficulty may be experienced, but it may be necessary to dilate and deliver artificially. If there is actual obstruction, try to push the tumour up out of the way. The knee-ellow, or the Trendelenburg position, may assist this proceeding. If you fail to dislodge the tumour, do not attempt to drag the child past it, because the pressure upon it may burst it, or injure it. The tumour should be removed. This may be done through the vagina, but the abdominal route is much preferable, as there may be adhesions, which would render the operation by the vagina extremely difficult, or even impossible. Tapping the tumour should never be done. When there are many adhesions, it may be necessary to open the uterus and remove the child to get at the tumour, but where it is at all possible, the tumour should be removed, and then the child delivered through the natural passages. To do this, a long abdominal incision will be necessary, so that the uterus can be turned out of the abdomen. It should be wrapped in warm sterile towels. After the tumour is removed, the uterus should be returned to the abdomen, and the abdomen may be temporarily closed by clamping the edges of the wound together with forceps, until the

child is delivered through the natural passages. The abdomen could be closed at once, but I prefer leaving the final closure until after delivery, to make sure that the pedicle is securely tied. The retraction of the uterus may easily cause the ligature to slip. There is much less risk to the patient, if she is delivered through the natural passages, than if a Cæsarean section is done.

In cases where delivery has occurred, and a fairly large tumour is left, the question of operating immediately, or some time later, will have to be settled. Where it is possible, it is well to wait until the second or third week of the puerperium, but if there is evidence of a rupture of the tumour, bruising of it, or twisting of the pedicle, the operation should be done at once. A sudden increase in the size of the tumour, or great pain in it, are urgent indications for operation. Persistent vomiting, and distention of the abdomen, are also urgent indications.

Parovarian Cysts.—These cysts are unilocular and thin-walled, and are liable to rupture during delivery, but if they are small this is of little importance, as they are filled with a bland, unirritating fluid, which will quickly be absorbed. I have twice seen cases where small tumours, which I took to be parovarian, disappeared during delivery without any bad effects.

Treatment.—This is the same as for ovarian tumours, but if a small tumour were to rupture during delivery an abdominal section is not likely to be required.

Tumours of the Fallopian Tubes.—Occasionally there is an extra-uterine gestation along with an ordinary pregnancy, and sometimes a hydro- or a pyo-salpinx is found. None of these conditions are likely to obstruct labour, as the tube will be drawn up from the brim of the pelvis into the abdomen.

Diagnosis.—This will be difficult, but if you find an elongated swelling at the side of the uterus in the position

of the tube, you may be pretty sure that it is a distended tube. The history may enable you to decide as to the contents of the swelling.

Prognosis.—It is a serious condition, if it is not dealt with before delivery, as rupture is liable to occur during delivery, and fatal peritonitis may be set up, or, if it is an extra-uterine gestation, the patient may bleed to death.

Treatment.—Remove the tube by abdominal section, as soon as you discover its condition, any time during the pregnancy.

Tumours of organs other than those of the pelvis may cause serious obstruction. For instance, a movable kidney, or the rare condition of a horseshoe kidney, may easily block the inlet of the pelvis. A hydatid cyst has been found in the pelvis causing obstruction. Malignant disease of the rectum is another serious complication. Fortunately, these conditions are all exceedingly rare.

Treatment.—A movable kidney may be pushed out of the way, but, if not, delivery should be effected by abdominal section. The same should be done for a horseshoe kidney. A hydatid cyst can be dealt with by incision through the vagina. With cancer of the rectum, if there is much obstruction, a Cæsarean section should be done in the interest of the child.

Hernia into Douglas's Pouch.—The bowel is sometimes prolapsed into Douglas's pouch before the presenting part. A softish, gurgling, oblong mass will be felt. It will not obstruct very much, but the pressure upon it may injure the bowel.

Treatment.—Push it out of the way with the patient in the knee-elbow position, or, if she is under chloroform, in the Trendelenburg position. If you cannot push it up, hasten delivery, so as to get the pressure relieved as soon as possible.

CHAPTER IV.

OCCIPITO-POSTERIOR POSITIONS OF THE HEAD.

OCCIPITO-POSTERIOR positions of the head occur in about 35 per cent of vertex presentations, the third position (R.O.P.) being by far the more common—about 30 per cent. In such cases, there is generally considerable delay, and the labour may be a very difficult one. The first stage is often prolonged, and this is specially true of primiparæ, but it is in the second stage that danger arises, and it is with it I shall principally deal.

Mechanism of Labour.—The third (R.O.P.) is the commoner of the two. It is the second in frequency

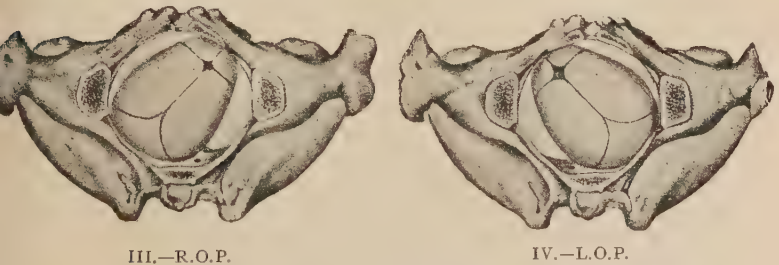


FIG. 14.—Occipito-posterior positions (from below).

of the four vertex positions. The long diameter of the head lies in the right oblique diameter of the pelvis, with the occiput opposite the right sacro-iliac joint.

If the head is well flexed, the movements it passes through are the same as in an anterior position, viz. descent, increase in flexion, rotation of the occiput forwards under the pubic arch, freeing of the head by extension, then external rotation of the head, or restitution, and the birth of the body by the posterior shoulder sweeping over the perineum. The head descends in the right oblique diameter of the pelvis, flexion increasing as it comes down, and when the occiput strikes the pelvic floor it passes forwards, occiput strikes the pelvic floor it passes forwards,

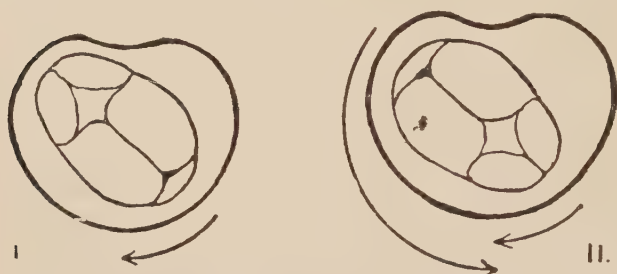


FIG 15.—Diagram to show the difference between occipito-anterior and occipito-posterior positions as regards internal rotation. I. Occipito-anterior. Occiput rotates to the front through $\frac{1}{2}$ circle. II. Occipito-posterior. Occiput rotates to the front through $\frac{3}{4}$ circle, or else forehead rotates to the front through $\frac{1}{2}$ circle. (Fothergill.)

according to the rule for internal rotation: that the presenting part which first strikes the pelvic floor must pass forwards under the pubic arch. The long diameter of the head thus passes from the right oblique diameter of the pelvis into the left oblique, and finally into the conjugate diameter, or, in other words, the head changes from the third position into the second, and the remainder of the mechanism is completed, just as if the head had been from the beginning in the second position. The internal rotation is thus a long one, through three-eighths of a circle, and manifestly more time will be occupied than in an anterior position. This is the

mechanism when the head is well flexed, and the occiput reaches the pelvic floor first; but in a fair number of cases flexion is not present, or comes undone, and, when the head reaches the pelvic floor, the sinciput, and not the occiput, strikes it first. If there is much undoing of flexion, the brow or face will be the leading part, and the case will be converted into a brow or face one, but this very rarely occurs. It is usually the sinciput which is the leading part, and it passes forwards under the pubic arch, and the occiput necessarily rotates backwards into the hollow of the sacrum. This is usually spoken of as a malrotation of the head. Strictly speaking, however, it is a perfectly correct rotation, according to the law of rotation, only, unfortunately, it is the sinciput, and not the occiput, which has passed forwards. It would be more correct to speak of it as a malrotation of the occiput. The head now lies with its longest diameter in the conjugate, with the sinciput under the pubic arch. The next movement to free the head is a bending of it forwards, round the pubic symphysis, *i.e.* towards the front of the mother, and also towards the front of the child—a movement of flexion. In regard to the mother, the movement is exactly the same as when the occiput is under the pubic arch, *viz.* a forward movement caused by the resistance of the perineum to the downward driving action of the expulsive powers, forcing the head in the direction of the resultant of these two forces, *viz.* forwards round the symphysis pubis. In regard to the child, when the occiput is under the pubic arch, the movement is one of extension; but, when the sinciput is under the arch, the movement must necessarily be one of flexion. When the occiput is freed, the nape of the neck is fixed against the front of the perineum, and extension now occurs round the perineum, and the

nose, face, and chin of the child slip from beneath the symphysis pubis. The body is born by the anterior shoulder passing forwards under the pubic arch, and the posterior one sweeping over the perineum. As the sinciput does not fit so well under the symphysis pubis as the occiput, a greater strain is thrown upon the perineum, and it is very liable to be torn.

Diagnosis.—By careful abdominal palpation, the position of the child can usually be made out. If the limbs are felt well to the front, and the back deeply placed, it must be an occipito-posterior position. In the majority of cases, the back will be to the right side (R.O.P.). The foetal heart-sounds will be best heard below the umbilicus, and several inches farther out than in an anterior position. By vaginal examination the anterior fontanelle is easily felt towards the front, but sometimes, especially when there is a large caput succedaneum, you may have difficulty in deciding which fontanelle lies to the front. Then the best way to make sure is to pass a finger up the anterior side of the head, and feel for an ear. The direction in which the pinna points will indicate the position of the occiput. Make sure that the ear is not folded forwards on the side of the head.

Management of Labour.—At the commencement of labour, if the head has not entered the brim of the pelvis, and if the child is freely movable, the position may be changed to an anterior one by external manipulation. The anterior shoulder is moved across the abdomen to the opposite side, and the posterior one is brought forwards. This can only be done when there is plenty of liquor amnii, and the woman's abdomen is lax and the wall not too thick. With primiparæ, this will be impossible, as the head will already have entered the brim.

When the head is well flexed, and the uterine contractions are strong, anterior rotation of the occiput will occur, and probably the labour will end naturally. No interference is required, unless the labour becomes too prolonged, and the patient begins to show signs of exhaustion, or unless there are indications, from changes in the rate of the foetal heart, that the child is suffering from the prolonged pressure. Then, delivery with forceps will be called for. If the occiput has rotated forwards, the delivery will be an ordinary low forceps one, but if the forward rotation has not occurred, you may apply the forceps, and trust to rotation occurring during delivery, or else you may rotate the head manually, before applying the forceps. Some authorities advise that the forceps should be used to rotate the head, but I am strongly opposed to this. If axis-traction forceps are used, they are not adapted for this, but they will allow of the head rotating, if it does so of its own accord. Forceps which promote flexion will assist forward rotation of the occiput. The straight forceps tend to do this, and they are therefore more useful in these cases than the ordinary long, double-curved ones. The best form to use is the straight axis-traction forceps, devised by the late Milne Murray for occipito-posterior cases. However, the ordinary axis-traction forceps answer the purpose so well, by allowing the head to rotate, if it will, that it is hardly worth one's while to carry both sets of instruments.

Instead of trusting to the occurrence of anterior rotation, or of using instruments to promote flexion, it is much better to flex and rotate the head manually, before applying the instruments. It is a very simple matter to grasp the head with a hand in the vagina and to turn the occiput forwards, but this will be of no use unless the position of the shoulders is changed. If

you merely twist the neck, the head will swing back into its old position as soon as you withdraw your hand from the vagina. What you should do is to grasp the head, flex it, and turn the occiput forwards, while with your external hand you manipulate the anterior shoulder across the abdomen to the opposite side. If the head is not deep in the pelvis, the internal hand may be

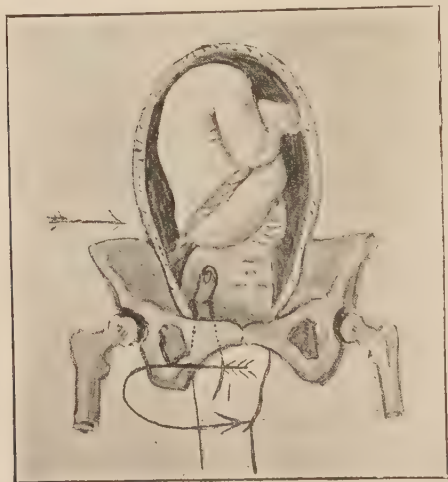


FIG. 16. —Method of rotating the occiput forwards in an occipito-posterior position of the head. The upper arrow indicates where the pressure is made with the external hand to push the front shoulder across to the other side of the pelvis.

passed beyond the head and the shoulder be turned forwards; but it is preferable to do this with the external hand, as there is always some risk in passing the hand into the uterus. When the position of the body of the child is changed, the occiput will remain forwards. You might then wait and allow nature to finish delivery, but, as the labour has already been prolonged, it will be preferable to apply the forceps and

deliver, more especially as your patient will already be anæsthetized.

If the forceps are applied before rotation has occurred, and the occiput passes forwards as the head is brought down, it will be necessary to take the blades off, and to reapply them after the rotation has occurred.

In cases in which backward rotation of the occiput has occurred, natural delivery may occur, if the child is small, but if the child is large, the probability is that the labour will be so prolonged that interference will be necessary. It will be impossible to rotate the occiput forwards, so the head must be delivered with the face to the pubes. The delivery must be done slowly and with great care, to save the perineum as much as possible. Some tearing is almost inevitable, especially in primiparæ.

Occasionally, a case will be met with in which the forceps slip off the head. They should be reapplied, so as to grasp the head in a better position, and if they again slip, you have a very awkward position to face, if the child is still alive. If the child is dead, there is no difficulty, as craniotomy is the proper operation to perform; but if it is alive, what are you to do? If you can call in a consultant, or send the patient into hospital, the difficulty will be solved, so far as you are concerned, but you may have to deal with the case yourself. A very common procedure in such a case is to do version, and if the uterus is not retracted round the child it may be successful, at all events, so far as the mother is concerned; but it is an exceedingly dangerous operation, if the liquor amnii has been drained away for hours. I have seen more cases of rupture of the uterus from attempts at version after failure with forceps than from any other cause. They have not occurred in my hands, but I have had to deal with them

afterwards. Do not attempt version, unless you are absolutely sure you will not rupture the uterus. If the forceps have held and you have failed to deliver, I have no hesitation in saying that version is absolutely prohibited. If the woman's condition is bad, do a craniotomy at once ; but if she is in good condition, allow the labour to go on and manipulate the head into a more favourable position. A slight change in the position of the head, and the additional moulding, will probably enable you to deliver with forceps later on. If you cannot manage to do so, you had better do a craniotomy, rather than endanger the patient's life by waiting too long.

CHAPTER V.

FACE AND BROW PRESENTATIONS.

FACE presentations occur about once in two hundred labours. Spontaneous delivery may occur, but the labour is certain to be a difficult one, and in some cases there is complete blocking, and the delivery of a live child is impossible. The danger to the mother is greater than in an ordinary vertex presentation, and it is very much greater to the child.

Causes of Face Presentations.—The head presents by the vertex, in the majority of cases, because the head is flexed upon the trunk. If, for any reason, there is extension instead of flexion of the head, a face or brow presentation is brought about. Extension of the head may have occurred before labour commenced, or it may have been brought about after the labour began, so that we may divide face cases into primary and secondary ones.

(1) The primary ones are caused by some abnormal condition in the child which has brought about extension of the head. The chin may be thrown up by an enlarged chest, or by tumours of the thyroid or thymus glands, or it may be dragged up by contraction of the muscles of the back of the neck, or by some deformity of the back of the head of the child, as in anencephalus.

(2) The secondary are brought about by the hitching of the occiput after labour has commenced. A dolicho-cephalic head predisposes to this, but a more

frequent cause is lateral obliquity of the uterus. If the uterus is oblique, as soon as labour begins, the occiput is driven against the side of the pelvis, where it may be arrested, and extension occur, and a face case results ; but if the head is arrested, so that extension cannot occur, a transverse presentation will be the result. A flattened pelvis predisposes to a face presentation, because the head presents in the transverse diameter of the pelvis, with the two fontanelles on a level, and one of the first movements of the head is a dipping of the anterior end, and if this dipping continues, the face naturally comes to be the presenting part. In rare cases of occipito-posterior positions of the head, the undoing of flexion becomes so great that a face case is caused. Any of the causes of abnormal presentations, such as excessive amount of liquor amnii, premature births, and dead children, may give rise to face presentations.

The chin or mentum is the leading part or denominator, and, as in vertex presentations, we have four positions. If we look upon these presentations as having been vertex ones originally and changed by hitching of the occiput and extension of the head, we find that—

- | | | | | | |
|----|--------|--------------|--------|-----------------------|---------------------|
| 1. | L.O.A. | changes into | R.M.P. | Right mento-posterior | (1st in frequency). |
| 2. | R.O.A. | „ „ | L.M.P. | Left „ „ | (3rd in frequency). |
| 3. | R.O.P. | „ „ | L.M.A. | Left mento-anterior | (2nd in frequency). |
| 4. | L.O.P. | „ „ | R.M.A. | Right „ „ | (4th in frequency). |

The right mento-posterior is the one which is most frequently met with. In vertex presentations, the posterior positions are more unfavourable than the anterior ones, and the same holds with facial presentations, even to a greater degree, and as the great majority

of face cases are mento-posterior, the majority of labours in face cases are sure to be very difficult.

Mechanism of Labour.—The mechanism is the same as in a vertex case, only the movements of extension and flexion are reversed. The movements are extension, engagement and descent, increase of extension, internal rotation of the chin under the pubic arch, and

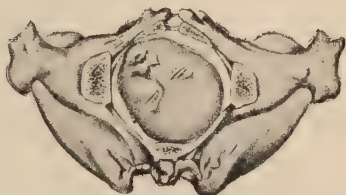
1. R.M.P.



2. L.M.P.



3. L.M.A.



4. R.M.A.

FIG. 17.—Four positions in face presentations (from below).

finally, freeing of the head by flexion, and the birth of the body, as in vertex presentations. In the anterior positions the internal rotation is a short one, just as in the same vertex positions, and in the mento-posterior positions, we have the same long interior rotation of the chin forwards, as of the occiput in occipito-posterior cases, provided the chin is the leading part, *i.e.* if extension is well marked; but, on the other hand, if extension is only slight, and the forehead of the child

strikes the pelvic floor first, it passes forwards, just as the sinciput does in non-flexed occipito-posterior cases, and the chin goes back into the hollow of the sacrum (Fig. 19). When this happens, there will be complete blocking unless the child is a very small one, and the chances of even a small child being born alive are very slight. The neck of the child is too short to allow of the



FIG. 18.—Birth of the head by flexion. (Playfair.)

birth of the head without the chest coming through the pelvis at the same time, and there is not room for this. Persistent mento-posterior cases are thus much more serious than persistent occipito-posterior ones. The latter may be, and often are, delivered by natural efforts, and if artificial delivery has to be resorted to, there should be no great difficulty in saving the child; but in the former, delivery by natural efforts is practically impossible, unless the child is very small or macer-

ated, and, if artificial delivery is necessary, in the great majority of cases, craniotomy will have to be resorted to.

Labour is generally delayed in both the first and second stages. In the first stage dilatation is delayed, as the bag of membranes usually protrudes in a sausage shape and ruptures early, and the face itself is a poor dilator. In the second stage there is delay, because the diameters of the head do not fit the pelvis well.



FIG. 19.—Chin rotated into hollow of sacrum. (Playfair).

The majority of the cases are mento-posterior to begin with, and if the chin comes to the front, a long internal rotation has to occur. As I have already stated, if the chin rotates into the hollow of the sacrum, complete blocking will probably occur. Another point is that the bones of the face are so firmly united that moulding of the head, such as occurs when the vertex presents, cannot occur to any marked extent, except as regards the soft parts.

Diagnosis.—The extended position of the head may

be made out by abdominal palpation, if the abdominal wall is thin, but, as a rule, the diagnosis is made by vaginal examination. At the commencement of labour, the presenting part will be high up, so there may be difficulty in reaching it. It will be softer and more irregular than the vertex, and the membranes will be felt protruding in a sausage shape. The anterior fontanelle will be felt, if the extension is incomplete, and the orbital ridges, eyes, nose, mouth, and chin will be easily felt when extension is marked and the face is coming into the brim. After the membranes are ruptured, the finger can be passed into the mouth to feel for the gums and tongue, which will enable you to distinguish the face from the breech. In the latter case, the finger will be covered with meconium. Care must be taken not to injure the eyes. The direction in which the chin is pointing should be carefully ascertained.

Treatment.—During the first stage, if possible, keep the membranes intact until full dilatation of the os has occurred. Unfortunately, early rupture of the membranes is liable to occur, and when this does happen the best thing to do will be to insert a Champetier de Ribes' bag to ensure dilatation, and keep sufficient liquor amnii in the uterus to prevent retraction of the uterus round the child.

Mento-anterior cases.—When the case is a mento-anterior one, it should be left to nature for a reasonable time. Unless the child is a large one, the probability is that the labour will end naturally, if the uterine contractions are good. You will only need to interfere, if the labour is becoming too prolonged, or if the mother or child begins to show indications that call for delivery. Be guided by the same principles as in vertex cases. The method of delivery to be adopted is by forceps. The blades are easily applied to the sides of

the head, and the chin lies between the shanks. During the delivery great care must be exercised to prevent severe laceration of the perineum.

Mento-posterior cases.—In mento-posterior cases you may wait and see what nature will do, but I personally am strongly opposed to this, unless the face is well into the cavity of the pelvis. If the patient is seen early, I believe in interference in every case, as soon as the os is fully dilated. If you leave the case to nature, anterior rotation of the chin may occur, but probably the labour will be so prolonged that artificial delivery will become necessary when the mother is exhausted, and the child is suffering from the pressure. Another reason is that the chin may rotate into the hollow of the sacrum, and then the child will almost inevitably have to be sacrificed, and the mother will probably have to run the risk of a craniotomy operation.

There are two methods of delivery, either of which may be adopted, viz. conversion of the face presentation into a vertex one, or version. In secondary face cases either of these methods of delivery may be adopted, while in primary cases only the latter can be used, because flexion of the head cannot be brought about.

How to convert a Face Presentation into a Vertex one.

—This is done by flexing the head, and is applicable only in secondary face cases. It can be done with ease, provided the head is not jammed into the pelvis. A method by external manipulation is sometimes described, but it is of so little use that I shall not give it. The following internal method is extremely easy of performance. Pass your sterilized hand in and grasp the head, so that your fingers are over the occiput and your thumb over the forehead, and pull the occiput downwards with your fingers, and press the forehead upwards with your thumb. Flexion will easily be

accomplished, if the case is a secondary one and if the face is not jammed into the pelvis. If the face should be partially engaged, push it up so as to disengage it, before you attempt to flex the head. If the case should be a primary one, you will not be able to flex the head. You should then pass your hand in and do version, provided the uterus is not retracted round the child. Finish the delivery in the usual way. Version may be

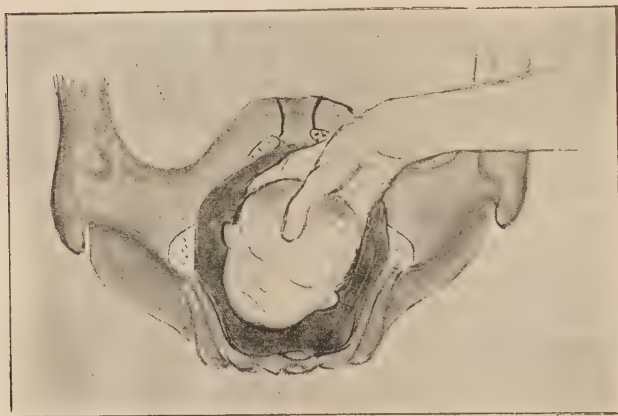


FIG. 20.—Method of flexing the head in a face presentation by grasping it with the fingers over the occiput, and the thumb over the forehead.

done in secondary cases, instead of flexion of the head, but the risk to the child is very much greater, so the latter method should always be adopted, if it is possible. When you have converted a mento-posterior presentation into a vertex one, the occiput lies to the front, and if you choose, you may leave the delivery to nature ; but, as the woman is anæsthetized, it is preferable to finish the delivery with forceps.

When the membranes have been ruptured for a long time, the uterus will be moulded round the child and

the face jammed into the pelvis, so neither flexion nor version should be attempted. The child must be delivered face first. If there is delay, you can assist matters by pushing the forehead up and hooking the chin down, so as to encourage forward rotation. If forward rotation is not occurring, you can bring it about manually in the same way as in occipito-posterior cases, by grasping the head and turning the chin forward, while at the same time you change the position of the body, by manipulating the shoulder across the abdomen with your external hand. The position of the body must be changed, otherwise the chin will swing back. If the natural efforts are not sufficient to deliver after the chin is rotated forwards, forceps should be applied. If you fail to deliver with forceps, do a craniotomy. Generally speaking this extreme measure is only called for when the child is very large, or when the pelvis is contracted.

When the chin has rotated into the hollow of the sacrum, natural delivery is impossible, unless the child is an extremely small one. Forceps delivery may be successful with a small child, but the probability is that craniotomy will have to be resorted to. If the child is alive, try the forceps, and if you fail, do a craniotomy. If the child is dead, do not try the forceps, but at once resort to craniotomy. The perforation can be done through the orbit, roof of the mouth, or under the chin. Through the roof of the mouth is usually the best place. The combined instrument can be applied, and the head crushed and extracted, just as if the vertex had presented (Fig. 21).

When a child is born face first, no matter how the delivery may have been effected, the soft parts of the mother are liable to be bruised, and the perineum to be torn. All tears should be carefully repaired by stitch-

ing. The child's face will be very much swollen over the eyelids, cheeks, mouth, and nose, from the forma-



FIG. 21.—Face case delivered by combined instrument.

tion of the caput succedaneum. There may be considerable effusion of blood into the conjunctivæ. The head will be flattened from above downwards, and the occipito-frontal diameter will be elongated, giving a

dolicho-cephalic appearance. This dolicho-cephalic condition of the head is generally supposed to have been the cause of the facial presentation, but it is probably an effect and not a cause. The child presents a very ugly appearance, and for a few days it may not be able to suck. Before the birth it is advisable to warn the friends that the face will be disfigured, otherwise they may blame you for having caused the disfigurement.

To sum up the treatment. In mento-anterior cases leave the delivery to nature, so long as it is safe for both mother and child, but if the labour becomes prolonged, apply forceps. In mento-posterior cases, as soon as the os is fully dilated, flex the head and deliver with forceps, or if you cannot flex the head, deliver by version. When the face is engaged, and you cannot flex the head, do not attempt version, but promote extension, and assist internal rotation. If nature fails to deliver, apply forceps. If you fail with forceps, do a craniotomy. When the chin has rotated into the hollow of the sacrum, if the child is alive, try forceps, and, if you fail, do craniotomy. If the child is dead, do not try forceps, but do craniotomy. When the uterus is firmly retracted round the child, never under any consideration attempt to do version. This applies to other than face cases, but it is a warning which cannot be too often given.

Brow Presentations.—A brow presentation may be considered to be an arrested face presentation, in which extension has not been completed. If the extension continues, the case will end as a face one, and this is what most frequently happens. In a few cases, flexion occurs, and the cases are converted into vertex ones, but in some, the brow presentation continues throughout delivery. These cases are very much rarer than face ones, and are caused by the same conditions.

Diagnosis.—The anterior fontanelle is easily felt and the face can be reached ; but the brow is really the leading part of the child.

Prognosis.—If the case is left to nature, the risk to the mother and child is greater than in a face case, and much greater than in a vertex case. If the condition is recognized early, and proper treatment adopted, the risk should not be greater than in a face case.

The mechanism of labour is the same as in a face presentation, the brow following the same movement of internal rotation as the chin.

Treatment.—If seen early, it should be converted into a vertex presentation by flexing the head, as in a face case, and if this cannot be done, version should be performed, if the uterus is not retracted round the child. When the brow has rotated forwards under the symphysis pubis, it may be possible to flex the head by passing the hand up the back of the pelvis and pulling the occiput down in the same way as in flexing a face case. The hollow of the sacrum allows of this ; but if the brow has rotated into the hollow of the sacrum in posterior cases, it will be impossible to do this. Recently, I was able to flex the head in a case where the brow was showing under the symphysis pubis. The case then became an occipito-posterior one, and as the head was not jammed, I turned the occiput forwards and manipulated the shoulders round, and the delivery by forceps of a live child was very easily accomplished. If it is too late to flex the head or do version, the chin should be brought down, so as to convert the case into a face one, and the subsequent treatment is the same as for a face case. If this cannot be done, delivery with forceps should be tried, and if this fails, craniotomy must be resorted to. If the child is dead, craniotomy should be done at once.

CHAPTER VI.

PELVIC PRESENTATIONS.

PELVIC or breech presentations occur in about 3 per cent of all labours. The labour may be easy and natural, especially in multiparæ, but difficulties may arise in both the first and second stages. The mother may not run any greater risk than in an ordinary head-first labour, but if there is obstruction there is always some risk. The danger to the child is considerable, as 20 per cent of the children are born dead. The danger to the child arises in various ways. The membranes usually rupture early, and the first stage is thus likely to be prolonged. During this, as well as the second, stage, the child is subjected to pressure. The placenta may, not improbably, be pressed upon, and the cord, which is often prolapsed early in the labour, certainly cannot escape compression during the latter part of the second stage of labour, as the head is passing through the pelvis. There is, therefore, very great risk of interference with the purification of the foetal blood, and this may cause the death of the child. When the body of the child is born, the lowered temperature to which it is exposed causes it to gasp, and to draw mucus into its air passages, and this may cause suffocation. The child may also be injured, and even killed, during artificial delivery. The legs, arms, or clavicles may be broken or dislocated. The neck may be dislocated, and the spinal cord injured, and injury to the cord may occur without dislocation of

the neck. The soft parts of the child may be injured, as in the folds of the groin when injudicious traction is made, and the mouth may be torn in delivering the after-coming head. In a contracted pelvis, the skull may be fractured, or a blood-vessel may burst in the brain. It will thus be seen that the risk to the child is very great. Even if it is born by natural efforts, it is likely to be asphyxiated, and artificial respiration usually is necessary. After delivery, the child may suffer from convulsions, and occasionally it remains feeble, and cries a good deal. Death may ensue in a day or two. In these cases, there have been hæmorrhages into the brain or meninges, and if the child survives, imbecility may result.

Varieties of Pelvic Presentation.—There are three varieties, viz. breech, where the buttocks present; footling, where one or both feet present; and knee, where one or both knees present. In the breech variety the attitude of the foetus is one of more or less complete flexion. The thighs should be flexed upon the abdomen, and the legs upon the thighs. When the attitude is one of complete flexion the feet are out of reach, but if the flexion is not complete, the feet are lower down and can be felt at the brim, giving a footling presentation. In some cases, the legs are not flexed, but extended, and the feet lie well up on the chest. In this condition, the body of the child is not flexed, and these are the cases in which impaction of the breech occurs. When flexion is marked, there is not likely to be much difficulty in the labour, but when flexion is undone, difficulty is sure to arise. We shall discuss this shortly. In the knee variety, the attitude of flexion is undone, and the thighs, instead of being flexed, are extended with the legs flexed upon them, so that the foetus is in a kneeling attitude. This is the rarest of the three varieties, and

is only likely to occur with a small foetus, so there may not be much difficulty in dealing with the condition.

Causes of Pelvic Presentations.—Broadly speaking, the foetus may be said to accommodate itself to the shape of the uterus, more especially during the later months of pregnancy. Naturally, the long axis of the foetus will occupy the long axis of the uterus, so that in the vast majority of labours at full time, either the head or the breech of the foetus presents. The preponderance of head presentations is said to be due to the action of gravity, as the head is much the heavier portion of the foetus. But this is not the true explanation, otherwise, in premature labours, when the head is proportionately much heavier than at full time, the head should invariably present. This is far from being the case. In premature labours there is a greater proportion of breech presentations than at full time. The shape of the uterus must be taken into account. At full time, the flexed back and breech of the foetus naturally fit the fundus much better than the head. By reflex movements, the foetus probably moves itself into the position which will cause least pressure upon it. Until well on in pregnancy, the foetus is relatively small, compared with the cavity of the uterus, and it may occupy any position, and change this position frequently, but, as full time is neared, it takes up the position which it occupies when labour commences. With a normally shaped uterus, where the foetus is normal, and there is a usual amount of liquor amnii, the head will present, but if the foetus is abnormal, premature, or dead, an abnormal presentation, probably a pelvic one, is liable to occur. Therefore, anything which interferes with the normal shape of the uterus or foetus tends to cause a pelvic presentation, *e.g.* hydramnios, multiple pregnancy, tumours of the uterus or foetus, contracted pelvis,

obliquity of the uterus, and placenta prævia. Monsters, dead or premature children, and those suffering from hydrocephalus, frequently present by the breech.

Diagnosis.—On palpating the lower part of the abdomen, you will be able to sink the tips of the fingers deeply into the brim of the pelvis, and you will at once notice that the rounded, hard head is not there. On palpating the fundus of the uterus, the round head will be easily made out. The foetal heart will be heard loudest above the umbilicus. The membranes, if unruptured, will protrude in a sausage-shape. They are likely to rupture early, because the breech does not effectually dam back the liquor amnii. In an ordinary breech, the presenting part will be much softer than the head, not so rounded, and no sutures or fontanelles will be felt. The sacrum, coccyx, and ischial tuberosities can be recognized by the bony projections. When the membranes are ruptured, the anus and genital organs can be felt. The anus can be told from the mouth, by the fact, that there are neither hard gums nor tongue inside of it, and the examining finger will be stained with meconium. The anus has been mistaken for the undilated os, and attempts made to dilate it. The crest of the ilium can often be reached, and it may easily be mistaken for the edge of the scapula in a shoulder presentation. The fold of the groin is very like the axilla, but in the latter, there are ribs, while the former is soft. When one foot presents, it may be down in the vagina before the os is fully dilated. It can be distinguished from the hand, in that it is placed at right angles to the limb, the heel is prominent, the toes are about equal length, and the big-toe cannot be abducted at right angles to the others, nor flexed over the sole, as the thumb can be over the palm. When the knee presents, it may be mistaken for the elbow, but it is

broader, and not so pointed, somewhat depressed in the centre, with a prominence at each side, while the elbow is prominent at the centre, and depressed at each side. If you have any difficulty in deciding the matter, pass your hand along the limb until you reach either the hand or the foot. This will enable you to make a definite decision.

Prognosis.—As I have already said, the risk to the mothers is no greater than in vertex presentations, but for the children there is great risk, and 20 per cent of them are born dead.

Positions.—There are four positions, as in vertex cases. The sacrum is usually taken as the denominator, but, unfortunately, it is not the part which leads, neither does it follow the rule of internal rotation, viz. to pass forwards under the pubic arch. It is the front hip of the child which leads and rotates forwards. According to Berry Hart's nomenclature, the positions are divided into dorso-anterior and dorso-posterior, and each of these into right and left coxa-cotyloid. Right and left, anterior and posterior, all refer to the mother.

- | | | | |
|----|------------------|---------------------|----------|
| 1. | Dorso-anterior. | Right coxa-cotyloid | = L.S.A. |
| 2. | „ „ | Left „ „ | = R.S.A. |
| 3. | Dorso-posterior. | Right „ „ | = R.S.P. |
| 4. | „ „ | Left „ „ | = L.S.P. |

In the dorso-anterior the back of the child lies anteriorly, and in the first (R.C.C.), the child's left hip is to the front and right side of the pelvis, opposite the right cotyloid foramen, the bis-iliac diameter of the child in the left oblique of the pelvis. In the second (L.C.C.), the child's right hip is to the front and left side of the pelvis, opposite the left cotyloid foramen, the bis-iliac diameter of the child in the right oblique of the pelvis. In the dorso-posterior, the back of the child lies towards

the back of the pelvis, but either the right or left hip will be to the front. In the third (R.C.C.), the right hip is to the front and right of the pelvis, opposite the cotyloid foramen, the bis-iliac diameter of the child in the left oblique of the pelvis. In the fourth (L.C.C.), the left hip lies to the front and left of the pelvis, opposite the left cotyloid foramen, the bis-iliac diameter of the child in the right oblique of the pelvis.

1.—L.S.A.

2.—R.S.A.

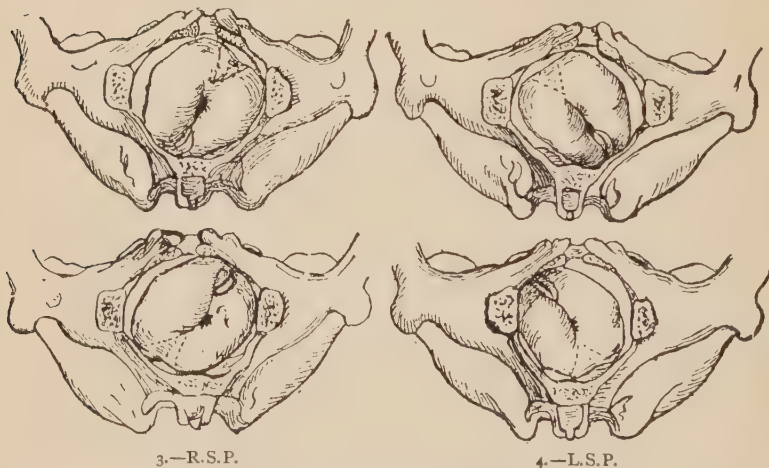


FIG. 22.—Four positions in breech presentation (from below).

As in vertex cases, the first is by far the most frequent and the third the next in frequency.

Mechanism.—When the foetus is small, it may be driven straight down without any internal rotation of the breech, but, as a rule, the anterior hip passes down in advance, and rotates forwards under the pubic arch. The first movement is descent, which is continuous throughout. The anterior hip is in advance, the bis-iliac diameter in one or other oblique diameter. In the first

and third, it is in the left oblique, and in the second and fourth, in the right. When the leading or anterior hip strikes the pelvic floor, it passes forwards under the pubic arch, and the posterior one is forced over the perineum by lateral flexion of the body. The legs and body are then expelled. The arms should be folded across the chest. The anterior shoulder passes forwards under the pubic arch, and the posterior one sweeps over the perineum, and the shoulders and arms are freed. The after-coming head enters the brim with the occipito-frontal diameter in the transverse of the pelvis, and, as it comes down, the occiput rotates forwards under the pubic arch and the sinciput passes into the hollow of the sacrum. This causes external rotation of the body. The nape of the neck is pivoted under the symphysis pubis, and the head, which is already flexed, is thrown clear by an increase of flexion, which causes the chin, face, and forehead to sweep over the perineum. In a few rare cases, with a small child, the chin, instead of the occiput, passes forwards. The chin, face, and forehead may then be expelled by extreme flexion of the head, or the occiput and vertex may be forced over the perineum, and the head be born by a movement of extreme extension, the face of the child looking directly into the vagina, as the birth is completed.

The caput succedaneum will be over the leading hip and genital organs, and in a male child the scrotum and penis will be much swollen, and the former may be quite black from effused blood.

Management.—If the patient is seen before labour has commenced, the position of the child should be changed by external manipulations, so as to bring the vertex into the brim. In primiparous cases this is of special importance, as they are the ones in which breech presentations are almost sure to give trouble. As I

have already said, where it is possible, a visit should be paid to every patient a day or two before the labour is expected, to ascertain how the child is lying, and if the presentation is an abnormal one, efforts should be made to correct it. When labour has commenced, it is too late to change the position of the child. The membranes should be kept intact, if possible, until the os is fully dilated. Do not allow the patient to be up during the first stage. The best position for delivery is the lithotomy one. Leave the delivery to nature until the breech is born, and the body expelled, as far as the umbilicus, then draw down a loop of the cord and feel if it is pulsating. If the cord is quite flaccid and pulseless, the child is dead, and there is no need for any hurry ; if it is pulsating quite freely, there is no immediate danger to the child ; but if pulsation is very quick and feeble, or if it ceases during a pain, delivery must be effected quickly, if the child is to be saved. If the cord passes between the buttocks, the loop should be slipped free. In any case, when the child is alive, delivery must not be delayed many minutes, as the risk is considerable from pressure upon the placenta or cord, or from the child making respiratory efforts, and thus suffocating itself by drawing mucus into its air-passages. A warm towel should be wrapped round the child's body to prevent it getting chilled, as the effect of cold on the body is to stimulate respiration. While the body is being expelled, supra-pubic pressure should be kept up, to keep the head flexed and to prevent the arms passing up by its side. This is of great importance. Up to this time traction should not have been made upon the body of the child. If the arms are not quickly expelled, they must be brought down. The posterior arm is the one which is generally the more accessible. Seize the child's legs with one hand, and swing the body well towards

the mother's abdomen, and then pass the other hand into the vagina, and slip the fingers, along the body of the child, into the bend of the elbow, and sweep the forearm and hand down over the front of the child. To relieve the other arm, you will probably have to change hands. Swing the body of the child towards the back of the mother, and pass your other hand into the vagina, so as to seize the arm and sweep it down over the front of the child. If you have difficulty in reaching the arm in the front, rotate the body of the child, and this will bring the arm to the back, where it can be easily reached. Care must be taken not to fracture the humerus. The head may be expelled by nature, but, as a rule, assistance is required. There are various methods of delivering the after-coming head, but the best method is by suprapubic pressure, with which traction upon the body can be combined. An assistant should place both hands over the fundus, and make firm pressure downwards and backwards. In this way, the head is kept well flexed, whereas, if traction is made from below, before the head is in the cavity of the pelvis, extension will occur, which will increase the difficulty of delivery. By firm suprapubic pressure the head can be pushed into the cavity of the pelvis, even if the conjugate diameter should be moderately contracted. When the head is in the pelvic cavity, traction from below should now be applied, in addition to the pressure from above. Various grips are described, but the following method is the most useful. Place the body of the child on your left arm, and pass the fingers of the left hand along the posterior part of the vagina, until the face is reached, and then place two fingers on each side of the nose. Grasp the shoulders, by placing two fingers of the other hand on each side of the neck, or pass the fingers higher up behind the pubic arch, and press upon the

occiput. Now make traction, and at the same time swing the body of the child as far forwards as possible on to the mother's abdomen, and flex and lever the head out. Care must be taken to deliver the head slowly, and well flexed, otherwise the perineum may be badly torn. If the face has rotated forwards, the same method should be adopted, but the body of the child should be swung back towards the mother's back, and the face should be brought out by flexion. Supra-pubic pressure follows nature's method of expulsion, and if not sufficient alone, should be practised along with traction. It is not advisable to pass the fingers into the mouth, as the jaw may be fractured or dislocated, or the mouth may be torn. If the child is dead, this does not matter, but with a live child it would be a very serious matter. In applying traction to the body of the child, care must be taken not to injure the neck. If there is any delay, the child will be born asphyxiated, so, in every case, preparations for reviving it should be made beforehand.

Delay in the First Stage of Labour.—If the membranes rupture early, as they very frequently do, the first stage will be prolonged. The uterus gets closely moulded round the child, and the pressure may cause its death. Prolapse of the cord is also not unlikely to occur, and there is therefore grave risk to the child. In the interest of the child interference will generally be called for. If the case is seen early, before the whole of the liquor amnii has drained away, a Champetier de Ribes' bag should be inserted. By its means the remainder of the liquor amnii will be retained in the uterus, and pressure upon the child will be prevented, while, at the same time, the cervical canal will be rapidly dilated. If the cord has prolapsed it should be replaced, and the bag will keep it up in the uterus. The second stage of the labour

should be managed in the way just described, leaving the delivery to nature until the breech is born, unless there are indications calling for immediate delivery. When the membranes have ruptured early, the foetal heart rate should be carefully watched. If there is any great change in it, it is an indication of danger, and prompt measures must be taken to deliver. If the os is not fully dilated, manual dilatation under chloroform should be done. Before bringing down the legs, and attempting delivery, make sure that the os is dilated sufficiently to allow of the passage of the head. If the head is gripped by the cervix, the delay in getting it through may cause the death of the child, and if the head is delivered quickly, dangerous laceration of the cervix may be caused. In the interest both of mother and of child, it is therefore of the greatest importance to have the os as fully dilated as possible, before attempting to deliver.

Delay in the Second Stage of Labour. Impaction of the Breech.—In a certain number of cases, the breech comes down into the pelvis, and there is no further advance. The large size of the child may cause this, when the soft parts are rigid in a primipara, or it may be caused by an obstructing tumour, or a contracted pelvis, but a very common cause is extension of the legs so that the feet lie well up on the chest. This latter condition is an exceedingly difficult one to deal with.

I do not consider satisfactory an explanation, often given, of the cause of impaction when the legs are extended, viz. that the pelvis is flexed upon the trunk at the lumbar articulations, and the trunk, pelvis, and legs of the foetus form a wedge which cannot pass through the maternal pelvis. The pelvis of the child is jammed into the mother's pelvis, and is not flexed in the way described. Neither do I agree with the suggestion that

the extended legs act as splints to the body of the child, and prevent lateral flexion. The legs are hinged at the knees, and they cannot act as rigid splints. The membranes rupture early, and the liquor amnii drains away, and allows of the uterus becoming moulded round the body of the child. As retraction takes place, Bandl's ring forms, as a ledge, inside the uterus, and the feet, which are above the ring, are caught by it, so that the child is hitched by its feet. With each contraction of the uterus the ring contracts, and the child is held fast, instead of being forced down. The contractions may be extremely powerful, and yet no advance be made, because, the greater the strength of the contraction, the greater the resistance offered by the retraction ring.

Treatment.—Delivery may be effected by traction upon the breech, or by bringing down a leg and making traction upon it. While traction is being applied from below, firm supra-pubic pressure must be kept up, to prevent the arms slipping up and the head becoming extended.

Traction may be applied by means of forceps, but the blades do not grasp the breech firmly, and they are inclined to slip. Another method of applying traction is by hooking the fingers of one or both hands into the fold of the groin, but care must be taken not to break the femur. A blunt hook is sometimes advised, but this should never be used if the child is alive, as the soft parts are very easily injured. A fillet may also be used, such as a strip of iodoform gauze, which is passed round one or both thighs in the flexure, by means of the fingers, or a catheter and stillet. The fillet is useful, but care must be exercised to prevent fracture of the femur.

Undoubtedly, the best method of effecting delivery is by bringing down a leg. When the legs are flexed this can be done without difficulty, but when they are

extended the greatest care must be taken, and the patient should be deeply under chloroform, to relax the retraction ring and the lower uterine segment, otherwise rupture of the uterus may be caused. Pass the flattened-out hand along the abdomen of the child until the foot is reached, and then sweep the foot inwards across the child's abdomen, and draw it down below the retraction ring. If a contraction of the uterus comes on during this manœuvre, flatten the hand out, and wait until the contraction has passed off. When you get the foot down, make traction upon the leg, and at the same time get an assistant to apply firm supra-pubic pressure to keep the head well flexed, and to prevent the arms from passing up. If the arms are caught by the retraction ring, they will pass up, and they must be relieved by passing your hand in and sweeping them down, over the front of the child, in the way already described. The after-coming head should then be delivered by supra-pubic pressure and traction from below.

In a few rare cases, the breech cannot be got through until it has been broken up. The cephalotribe should be used to deliver with, and the after-coming head should be perforated, before an attempt is made to drag it through. Breaking up of the breech is only likely to be necessary when there is an abnormality of the child, or of the mother's pelvis. In the former condition it would be perfectly justifiable, but in the latter, with a live child, it would be justifiable only if delivery by Cæsarean section were too dangerous for the mother.

Upward Displacement of the Arms.—In most cases this can be prevented, if supra-pubic pressure is properly applied during the descent of the body of the child. If the arms have passed up, they should be relieved in the way already described. Occasionally, one arm

gets displaced behind the head, and then there is difficulty in sweeping the forearm forwards over the face of the child. In effecting this movement the humerus may easily be broken. To free the arm from behind the head, twist the body of the child, and cause the head to rotate towards the arm, so as to dislodge the arm and bring it to the side of the head, and it can then be swept down in the usual way. In backward displacement of the arms, I have occasionally deliberately broken the humerus in order to free the arm, in time to save the child's life. Fracture of the humerus, separation of the epiphysis and diaphysis, or fracture of the clavicle may occur. The arm may be paralysed from injury to the brachial plexus.

Impaction of the after-coming Head.—This may occur above the brim, or in the pelvic cavity. The latter condition is not serious, but the former is. It may be due to disproportion between the size of the passage and the head, caused either by a large head or by a small pelvis. The most frequent cause is extension of the head, and this is generally due to traction having been made on the body without supra-pubic pressure.

To save the child, prompt delivery will be necessary. Get an assistant to apply very firm supra-pubic pressure while you make traction on the body, and at the same time flex the head as much as possible, in the way already described. Forceps are sometimes useful, and they should always be ready for immediate use when you are delivering a breech case. The blades are applied to the sides of the head, and the chin lies between the shanks. The body of the child should be thrown well forward on to the mother's abdomen when the chin is behind. Traction on the forceps will flex the head and deliver it rapidly.

If the head is too large to pass in an ordinary sized

pelvis, or the pelvis is too small to allow it to do so, prolonged traction on the body or on the head by means of forceps should not be indulged in. Vigorous traction upon the body may not only break the neck, but even cause decapitation, a very serious accident, as you may experience the utmost difficulty in delivering a decapitated head, especially if the pelvis is contracted. Under no consideration should the neck be severed.

If the head has been impacted for any length of time, the child will be dead, and if, by supra-pubic pressure and traction, delivery cannot be effected, then the head should be lessened in bulk by perforation and evacuation of the brains. The perforation may be done behind the ear, or through the roof of the mouth. As a rule, the use of a cephalotribe will not be necessary. Traction of the body will generally suffice. If decapitation has occurred, the head should be perforated and delivered with the cephalotribe. If the head is hydrocephalic, it should be perforated at once. A fairly large hydrocephalic head may be dragged through, but the risk of rupturing the cervix and lower uterine segment is very great.

Malrotation of the Head.—It is rare for the chin to pass to the front. This can be prevented, during the delivery of the body, by rotating it, so as to bring the chin behind. If you find the body born and the chin to the front, try first to turn the head round so as to rectify the position, and if you cannot do this you must deliver with the face to the front. Swing the body of the child well backwards towards the mother's back, and flex the head and make traction upon the body, in the way already described. Forceps are not useful in such a case, as they will not promote flexion of the head unless they are applied in the reverse way.

If the chin becomes hitched above the symphysis

pubis, the occiput may descend into the hollow of the sacrum, and then the occiput must be delivered first. In such a case the strain upon the perineum is very great, and a bad rupture is not unlikely to occur. The body of the child must be swung well on to the mother's abdomen while traction is made. Forceps may be applied behind the body of the child, so that the occiput lies between the shanks. If the child be dead, perforation of the head should be done before making any attempt to deliver by traction, to save laceration of the perineum.

Laceration of the perineum is very liable to occur in breech cases, so a careful examination should always be made, after the child is delivered. All tears should be stitched at once. In primiparæ the perineum is often torn when the hand is passed into the vagina to free the arms, and then, when the head comes down, the tear is likely to be increased.

CHAPTER VII.

TRANSVERSE PRESENTATIONS.

IN a transverse presentation some part of the trunk presents, and, as it is most frequently the shoulder, it is often spoken of as a shoulder presentation. The hand, arm, elbow, shoulder, or ribs may be felt. The arm may be prolapsed into the vagina, and the hand may protrude from the vulva.

As a rule, the long axis of the foetus is more or less transverse to the long axis of the mother, but this is not always so. I have seen two cases, in both of which the arm was in the vagina, and yet the long axis of the foetus was in the long axis of the mother. In both, the neck was so acutely bent that the head lay well up against the body, and the breech was at the fundus. There was no deviation of the uterine axis.

Causes.—Prematurity, death of the foetus, excessive amount of liquor amnii, placenta prævia, twins, tumours of the pelvic organs, and anything which alters the uterine axis, are all causes.

Mature foetuses with an excessive amount of liquor amnii can move about freely in the uterine cavity, and they have a tendency to present transversely. The same condition is present with premature foetuses; relatively, the amount of liquor amnii is large, so they, too, tend to present in the same way. A dead foetus is much more flexible than a living one, and any part of its body instead of the head may be driven down.

With placenta prævia, we have both the altered shape of the uterine cavity and the prematurity of the foetus, as predisposing causes. With twins, one or both may be transverse from the altered shape of the uterine cavity, and they too tend to be born prematurely. At full time, obliquity of the uterus is the most frequent cause. When the uterine axis is oblique, the long axis of the foetus will be oblique to the long

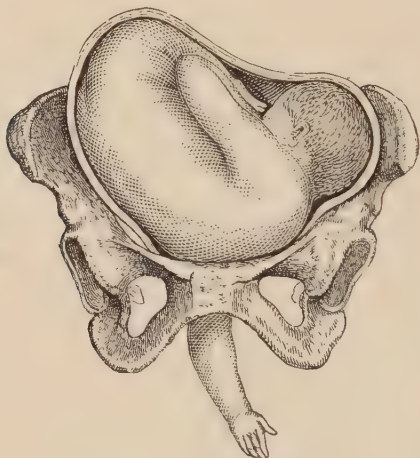


FIG. 23.—Transverse presentation : Dorso-anterior. L.A.A. (Playfair.)

axis of the mother, and when the head is the lower part of the foetus, it will lie in the iliac fossa of the side opposite to that towards which the fundus leans. If the head is so far over that the occiput cannot enter the brim, as the uterine contractions force the foetus down, a face or a transverse presentation must result. Which it is, will depend upon the way the foetus is lying. If the body is lying so that extension of the head can occur, the face will come into the brim, and a face presentation result ; but, if extension cannot

occur, the shoulder, or some part of the body, will enter, and a transverse presentation be brought about.

Frequency.—Transverse presentations occur about once in two hundred cases.

Diagnosis.—This can generally be made by inspection and palpation of the abdomen. The abdomen will appear broader than natural, and on palpating

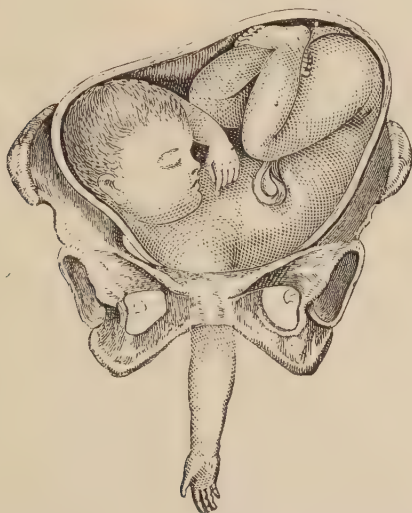


FIG. 24.—Transverse presentation : Dorso-posterior. R.A.P. (Playfair.)

it, the long axis of the foetus will be felt to lie more or less transversely to the long axis of the mother. The round head will be felt at one side, and the breech at the other, but not directly opposite. If it is dorso-anterior, the back of the child will be felt to the front, and if it is dorso-posterior, the limbs will be made out to the front. The foetal heart will be heard low down.

In the rare cases in which the long axis of the foetus is in the long axis of the mother, the head and chest of

the child will be felt above the pelvic brim, and the breech will be found at the fundus.

Per vaginam, the presenting part will be felt high up, unless the arm is prolapsed, when the hand may be at the vulva. If the membranes are unruptured, they will protrude in a sausage-shape. The presenting part will usually be softer than the head, and not so rounded. If it is the shoulder, you should be able to feel three bony ridges—viz. the clavicle, the humerus, and the spine of the scapula—radiating from one point. If the finger can be passed into the axilla, the ribs can be felt, and this will distinguish it from the fold of the groin in a breech case. If the hand presents, it can easily be distinguished from the foot by the absence of the heel, the difference between the length of the fingers and thumb, and the freedom with which the thumb can be bent over the palm, or extended at right angles to the hand. The elbow can be diagnosed from the knee by its pointed extremity, with a hollow at either side, instead of a hollow in the centre, with a prominence at either side. If you are in doubt, try to reach the hand or foot. When the side of the chest presents, the ribs can be easily distinguished. The cord is very frequently prolapsed.

Prognosis.—If the case is left to nature, the risk to the mother is very great; but if it is properly treated early, there should not be very much risk. In cases which are left to nature, or are improperly treated, the woman may die of exhaustion, of rupture of the uterus, from the result of operative interference, or from hæmorrhage or sepsis. Except with very small or dead children, the chances of the labour ending in delivery by natural efforts are very small. The risk to the child is exceedingly great. A living, full-time child can hardly be born alive by natural efforts. The liquor

amni generally drains away very early in labour, so that the child is subjected to pressure almost from the beginning of the first stage. The cord is usually prolapsed, and pressure upon it and also upon the placenta may kill the child, long before the labour is over. Even in cases which are properly treated, the risk to the child during the artificial delivery by turning is considerable.

Course of the Labour.—If the child is small, as in premature cases, or if it is dead and softened, and the uterine contractions are strong, the labour may end in its expulsion in one of the ways to be described. If it is large and alive, or only recently dead, it may be born by spontaneous rectification; but if this does not occur the uterus may rupture, or the contractions may entirely cease. If there is no assistance at hand, this latter termination is a very fortunate one for the mother. The child will be dead before this happens, and if the woman does not die of exhaustion, labour will come on again in a few days, when the child will be softened, and it may be expelled quite easily.

Positions.—The acromion process is the denominator, and four positions, corresponding to the vertex ones, are given. As in the pelvic presentations, they may be divided into two main divisions, viz. two dorso-anterior, and two dorso-posterior positions, *i.e.* a right and a left dorso-anterior, and a right and a left dorso-posterior: right and left, anterior and posterior, referring to the mother.

- | | | | | |
|----|------------------|----------------------|-------------------------|------------|
| 1. | Dorso-anterior, | Left-acromio-iliac = | Left-acromio-anterior | (L. A. A.) |
| 2. | Right | Right | Right | (R. A. A.) |
| 3. | Dorso-posterior, | Right | Right-acromio-posterior | (R. A. P.) |
| 4. | Left | Left | Left | (L. A. P.) |

In the first position the fœtus lies dorso-anterior, with its head in the left iliac fossa, and the right acromion process points towards the left obturator foramen

(L.A.A.). In the second position it lies dorso-anterior, with its head in the right iliac fossa, and the left acromion process points towards the right obturator foramen (R.A.A.). In the third position it lies dorso-posterior, with its head in the right iliac fossa, and its right acromion process points towards the right sacro-iliac joint (R.A.P.). In the fourth position it lies dorso-posterior, with its head in the left iliac fossa, and its left acromion process points towards the left sacro-iliac joint (L.A.P.). In the dorso-anterior, right and left of the mother and child do not correspond, *e.g.* it is the right acromion process of the child which points towards the left obturator foramen of the mother, and vice versa. In the dorso-posterior, they do correspond, as it is the right acromion process of the child which points towards the right sacro-iliac joint of the mother, and vice versa.

MECHANISM.

Spontaneous Rectification.—As I have already stated, the fœtus at the commencement of labour usually lies obliquely, with the head in one iliac fossa and the shoulder over the brim. The head can be felt bulging out the side of the uterus, just above the iliac crest. When the contractions come on, the uterus narrows and straightens itself, and if the head is freely movable, it may be pushed towards the axis of the brim and become substituted for the shoulder. Gravity will also assist this movement, if the woman is lying on the side opposite to that in which the head lies. The liquor amnii must be present. This is what is known as **spontaneous rectification**. It can only occur early in the first stage of labour, before the shoulder is driven down into the brim, and, of course, before the

membranes have ruptured. It probably occurs more frequently than we are aware.

Spontaneous Version.—This movement was first described by Denman as “Spontaneous Evolution,” but Douglas has described another movement under the name of “Spontaneous Evolution,” and to avoid confusion, it is better to call the movement described by Denman “Spontaneous Version,” and the one described by Douglas “Spontaneous Evolution.” The movements are very much alike, but they occur in different places, viz. the former in the uterine cavity, and the latter in the pelvic cavity. It is easy to remember which is which, as you naturally associate version with the uterine cavity from the fact that, when you perform it yourself, the child is in the uterine, and not in the pelvic, cavity.

When **Spontaneous Version** occurs, the arm may or may not be prolapsed. If it is, it will not be wholly outside the vulva. The body and head are still in the uterine cavity, the latter being jammed tightly into one of the iliac fossæ. The body is too large to come through the brim doubled up. As the uterus contracts firmly, the breech, which is the highest portion of the foetus and the only movable portion, is gradually driven downwards, until it is forced past the head through the brim and is expelled. The body turns on its own axis within the uterine cavity. The case then finishes like an ordinary breech one. For spontaneous version, the child must not be too large, and it must have a certain amount of resilience. An ordinary-sized living child, or one very recently dead, may be expelled in this way; but the movement cannot occur with a large live child, nor with a child which has been dead sufficiently long to be softened. In the former case, natural efforts will fail to deliver the child while it is

alive, but a dead softened child can come through doubled up in the way to be described as **Spontaneous Expulsion**.

Spontaneous Version takes place later in labour than spontaneous rectification, *i.e.* in the second stage of labour, while the latter occurs at the very beginning of the first stage. Both of these movements occur within the uterine cavity. It is often supposed that the portion of the uterus which is against the breech of the foetus is actively contracting, while the portion next the head remains passive, and the breech is thus driven down, while the passive portion allows the head to move upwards. This is only a supposition, and, for my part, I cannot accept it as the true explanation. I have never seen irregular contractions of the uterus have any effect, except that of causing suffering to the patient. I believe that the true explanation is that the head of the child is well out of the way in the iliac fossa and cannot pass downwards, but that there is room for the breech to come down, if the child is small. The powerful contractions act on the whole child, but the head is completely blocked, and, as the breech is movable, it is driven down. The head does not pass up until the breech is through the brim, and the passing up merely amounts to the head swinging in, as it must do, as the body straightens out. The head must be well out in the iliac fossa to prevent the shoulder being driven into the brim. If this happens, spontaneous version cannot take place; but if the child is not too large, the following movement of spontaneous evolution may occur in the pelvic cavity.

Spontaneous Evolution (Douglas).—This movement occurs in the pelvic cavity, and therefore late in the second stage of labour. The presenting shoulder is forced very low and forwards under the pubic arch. It

has followed the rule of internal rotation. The entire arm and shoulder can be seen, and the clavicle lies under the pubic symphysis. The head is above the pubis, bulging well forwards. As the strong uterine contractions go on, the side of the chest is forced downwards, and the ribs can be felt at the vulva. The clavicle is driven round the anterior part of the symphysis. The breech is coming down through the pelvic cavity, and more and more of the side of the chest appears at the vulva, until finally the breech is forced through the vulva, and the legs are thrown free. The labour then finishes like an ordinary breech one.

The movement is very like that of spontaneous version, only it occurs in the cavity of the pelvis, and not in the cavity of the uterus. The uterine contractions must be very powerful. A full-time child may be born this way, if it is small, and the woman's pelvis roomy, but the great pressure to which the child is subjected is apt to cause its death. Just as in spontaneous version, the child must not be large, and must possess a certain amount of resilience. If it is large, it cannot be born in this way, and if it is dead and softened, spontaneous evolution will not occur; but it may be born by spontaneous expulsion, which is the next movement to be described.

Spontaneous Expulsion.—This movement only happens when the child is dead and softened. The body is forced down doubled up, the head and feet being expelled together last. This method of birth is seen with macerated foetuses, and in those cases in which there has been a cessation of labour a few days previously, and the foetus has had time to become softened.

Treatment.—The chances of the labour ending naturally with safety to the mother and child are so ex-

tremely small, that interference is called for in every case in which the child is alive, and, in most cases, even though the child is dead. What the interference should be will depend upon the conditions present, at the time the patient comes under treatment.

If the patient is seen before the labour has actually set in, you should manipulate the head by external palpation, so as to bring it into the brim of the pelvis, and keep it there by means of pads and a binder. If you are able to see your patient a day or so before the onset of labour, you should be able to guard against the child coming transversely,—at least, in the majority of cases of obliquity of the uterus. If the cause of the transverse position of the child is a tumour, you may not be able to remedy matters by external manipulation, but such cases are exceedingly rare. When labour has set in, keep the membranes intact as long as possible, and by external manipulations between the contractions push the head into the brim and keep it there by means of pads and a binder, making the patient lie on the side opposite to which the head was lying. In other words, you bring about **spontaneous rectification**. If the membranes have only recently ruptured, and the child is still movable, try by external manipulations to bring the head into the brim. In any case in which you can alter the presentation into a vertex one, the remainder of the treatment will be the same as for a vertex presentation, and will depend on how the labour progresses. The case may be left to nature when the head has become engaged.

If the membranes are ruptured, and the head cannot be pushed into the brim, artificial dilatation should be resorted to. The best method of doing this is by Champetier de Ribes' bag. The bag will retain any liquor amnii that may be in the uterus, and thus lessen

the pressure upon the child. If the cord is prolapsed, it should be replaced before the bag is inserted. If an arm is prolapsed, the bag cannot be used, unless the arm can be replaced. In these cases, and in those in which the shoulder is down, the bag cannot be used, so manual dilatation will be necessary. In all cases in which the uterus is not retracted round the child, version should be done as soon as the os is fully dilated. The bipolar method of version may be used, but the internal podalic method is the one usually adopted. When the liquor amnii has been drained away for some time, great care must be exercised in doing version, for fear of rupturing the uterus. The woman must be deeply anæsthetized, to relax the uterus as much as possible. If any retraction has taken place, Bandl's ring will form a ledge round the interior of the uterus, before the presence of the ring can be detected by feeling through the abdomen. If the ring has formed, the shoulder will be fixed under it, and it should be released before the body is turned. In such a case, extreme care must be exercised.

In doing podalic version in transverse cases, the proper foot to seize will depend upon whether the child lies dorso-anterior or dorso-posterior. In dorso-anterior cases the nearer foot should be caught, and in dorso-posterior it should be the further away. The reason for this is obvious. In the dorso-anterior cases the back of the child is already to the front, and you do not wish to alter this. If you catch the nearer foot, as the child turns, its back will remain to the front ; but if you catch the further away foot, as the child turns, it will also rotate on its long axis, and the back will turn towards the mother's back, which you do not want. In the dorso-anterior cases you should therefore catch the nearer foot. In the dorso-posterior cases

you should seize the further away foot, as you not only wish to turn the child, but also to bring its back to the front.

When impaction has occurred, and the uterus is firmly retracted round the child, version should not be attempted, even if the child should be alive. If the child is alive, and spontaneous version or evolution is taking place, and the uterus does not show indications of rupturing, and the woman is not becoming exhausted, wait on nature for a time. The proper treatment in impacted cases in which spontaneous version or evolution is not occurring is decapitation, or embryulcia. If the neck can be reached, it can be cut through with a hook or a pair of scissors. The best hook is a cutting one (Figs. 97 and 98). Gigli's saw, a piece of wire, or even a piece of whiplcord, may be used ; but the vaginal walls must be protected, or they may be injured. When the neck is cut through, the body can be drawn out by catching hold of an arm, and the head by catching it with forceps or the cranioclast. If the pelvis is contracted, it will probably be necessary to perforate the head and crush it. Manipulate the head into the brim, so that the vertex will present, and get an assistant to hold it there, by grasping it with both hands through the abdominal wall, while you perforate and apply the combined instrument. In cases in which part of the body presents and the neck cannot be reached, break into the body and cut the spine across, and then catch a foot and deliver the child. As the spine is cut through, there will be no risk of rupturing the uterus. When a child is coming down doubled up, break into the body and draw it down by means of a crotchet.

When the long axis of the child is in the long axis of the mother, and the shoulder is into the brim, with the head lying against the chest, there may be diffi-

culty in reaching the neck. In the two cases which I have seen, I cut across from the upper axilla to above the presenting shoulder with the cutting hook. The body was then easily withdrawn by making traction on the protruding arm, and the head was delivered by seizing the arm which was attached to it.

After delivering a transverse case, care must be taken to guard against post-partum hæmorrhage, and shock must be combated.

The treatment of cases in which the uterus has ruptured will be dealt with under rupture of the uterus. If the cases are seen in time, this accident should not be allowed to happen. When a tumour is the cause of the transverse presentation, the treatment will depend upon the position and size of the tumour. If the tumour does not obstruct, you may employ whichever of the methods of delivery just described is suitable; but if the tumour obstructs, the treatment suitable for labour obstructed by a tumour, as described in chapter III., must be adopted. In all probability an abdominal section will be necessary.

CHAPTER VIII.

CONTRACTED PELVES.

Delay from Obstruction in the Pelvis is usually caused by contraction of one or more of the diameters of the pelvis, either at the brim or outlet, or at both. The contraction may be from deformity of the pelvis, or from a tumour, but occasionally you meet with a pelvis which is contracted, but not deformed. It is contracted in all its diameters, but is normal in shape—*Æqualiter Justo Minor Pelvis*. Deformity from a tumour is rare.

The commonest form of contracted pelvis met with in Glasgow is the flat and rickety. In the Maternity Hospital fully 10 per cent of our cases present this deformity in a marked degree, and many others slightly.

Methods of Diagnosing a Contracted Pelvis.—Many of the women show more or less deformity of the legs or spine, or of both. The arms may also be deformed, and the forehead be heavy and square. In most cases, the abdomen will be pendulous. If a primipara is observed to have a pendulous abdomen, contraction of the pelvic brim should be at once suspected. Deformity of the legs or spine does not, however, invariably mean deformity of the pelvis, as you occasionally see cases of even marked deformity of these without the pelvis being affected. Abdominal palpation is a very valuable method of diagnosis, especially at or near full time, when the head presents. The disproportion between

the size of the head and the brim of the pelvis can easily be made out.

Measurement of a Contracted Pelvis.—I have already referred to this in the first chapter, but it is advisable here to go more fully into detail. The most important external measurements are the intercrystal and interspinous. These will be found to be abnormal, but not necessarily shortened (in some instances, as in flat pelvises, they may be actually increased). In a normal pelvis the difference between these two diameters



FIG. 25.—Measuring the diagonal conjugate. (Fothergill.)

should be about 1 inch. With a contracted pelvis, especially a flat one, this difference does not exist. The interspinous diameter will be nearly, or quite, as great as the intercrystal one. The external conjugate diameter is measured from just below the tip of the spine of the last lumbar vertebra to the front of the pubis. As a guide to the length of the true conjugate, it is very fallacious, for it is impossible to estimate how much should be deducted for the thickness of the sacrum behind and the symphysis in front. Oblique and transverse measurements are also made, but they are of very little use. The important external measure-

ments are the intercrystal and interspinous, *i.e.* the distance between the widest points of the iliac crests, and between the anterior superior spines. In a normal pelvis, the former should be 1 inch longer than the latter. A fair-sized pelvis would give 11 and 10 inches respectively.

The most important diameter of all is the *diagonal conjugate*, as from it a very accurate estimate of the true conjugate can be made. It is measured from the centre of the promontory to the lower edge of the symphysis. In a normal pelvis it is $\frac{1}{2}$ inch longer than the true conjugate, but in deformed pelvis $\frac{3}{4}$ inch should be allowed, on account of the greater thickness and depth of the symphysis pubis. In the living subject the diagonal conjugate can be easily measured, especially if the patient is anaesthetized. Various pelvimeters have been invented for taking the measurement, but none of them are better than—nor in my estimation as good as—the fingers. The measurement can be taken with the patient lying either on her back or left side. The fore and middle fingers of one hand are passed into the vagina and pressed up, until the tip of the middle finger touches the centre of the promontory. The position of the lower edge of the symphysis pubis is then marked on the edge of the hand with the nail of the forefinger of the other hand (Fig. 25). The distance from this point to the tip of the middle finger gives the length of the diagonal conjugate. By subtracting $\frac{3}{4}$ inch from this in an abnormal pelvis, you get a very fair estimate of the length of the true conjugate. In a normal pelvis it is difficult to reach the promontory, unless your fingers are exceptionally long; therefore, in every case in which the promontory is reached with ease, some contraction is likely to exist. On the other hand, if you cannot reach it, you may

feel pretty confident that the conjugate is not contracted.

In some cases a double promontory is met with, or there may be a ridge on the sacrum which feels very like the promontory, so care must be taken to make sure that you have reached the centre of the true promontory—*i.e.* the higher one.

The most accurate method of gauging the size of the conjugate is by passing the fingers or the closed hand in, and rotating the hand into, the conjugate. If the conjugate will allow the hand to pass easily, the thumb may be placed by the side of the hand and the exact size estimated. My hand happens to be small, and only measures 3 inches across the knuckles, so that, when I find it will just pass, I know I have to deal with a 3-inch conjugate. If you know the size of your hand, you need no other measure. This examination can only be made under chloroform, and is best done when the os is fully dilated. After delivery it is very easily made.

When measuring the size of the conjugate, you should always explore the shape of the inlet by sweeping the fingers round. One side of the pelvis may be found to be quite roomy. The size of the arch of the pubis should also be estimated, and the curve of the sacrum, and amount of projection and movability of the coccyx. The distance between the ischial tuberosities should also be ascertained. After some experience, you can very quickly form an estimate of the size and shape of a pelvis, and the likelihood of difficulties arising during labour.

Method of Increasing the Length of the True Conjugate during Delivery.—The sacro-iliac joints do not admit of much movement, but when weight is applied to the front of the innominate bones, they allow of a

certain amount of rotation of these bones. By placing the patient in the Walcher position, it is possible to enlarge the true conjugate about $\frac{1}{3}$ inch. The patient



FIG. 26.—Walcher position. (Fothergill.)

must lie on her back with her hips at the edge of the bed or table, and her legs hanging down. The feet must not touch the floor or be supported in any way. The weight of the legs drags on the front of the pelvis,

principally through the Y ligament of Bigelow. The innominate bones are thus dragged down from the sacrum, rotation taking place round the sacro-iliac joints. The symphysis pubis is drawn down and away from the promontory, and the true conjugate is lengthened about $\frac{1}{3}$ inch. The conjugate at the outlet is slightly decreased, as the symphysis pubis is brought nearer the coccyx, so that, as soon as the head has passed the brim, the patient should be placed in the ordinary position, to complete delivery. The gain of only $\frac{1}{3}$ inch may not seem very much, but when the pelvis is contracted, it will often enable you to deliver a live child, when this could not be done in the ordinary obstetric position.

The pelvis may also be enlarged by the opening up of the symphysis pubis, either accidentally or by the operation of symphysiotomy. I have only once seen this happen accidentally, in the delivery of an after-coming head by supra-pubic pressure through a flattened pelvis.

Risks to the Mother during Pregnancy and Labour.—

During pregnancy, the head is prevented from sinking into the pelvis, and as a consequence the uterus is high in the abdomen. The inter-abdominal pressure is thus increased, and the uterus is very liable to deviate to one or other side, or more frequently forwards, causing a pendulous abdomen. The patient will therefore suffer from pressure symptoms. During labour, the head may not fit into the brim, so the bag of membranes may protrude in a sausage shape and rupture early, and dilatation may be much delayed, or even prevented, if the head is unable to descend. If the contractions continue, the lower uterine segment will thin out, and Bandl's ring become apparent. There is then great risk of rupture of the uterus. If there is room,

the foetus may ultimately be expelled, but its head will be excessively moulded, and the bones sometimes indented or fractured by the pressure of the promontory (Fig. 27), while the mother's soft parts may suffer from bruising and laceration. If the contraction is too great to allow of the passage of the foetus, either the uterus will rupture or the patient will die of exhaustion.

During pregnancy, the risks to the foetus are not any greater than in an ordinary case, but, during delivery, they are enormously increased.



FIG. 27.—Deep depression of the left frontal bone, caused by the promontory. Relieved by incision and elevation.

Abnormal Pelvis (*Æquabiliter Justo Major Pelvis*).—

This is not a contracted pelvis, but a uniformly enlarged one. It might be called a giant pelvis. The woman may not be very tall, but she will be large-framed.

The only effect this kind of pelvis has on labour is to allow of it being quick and easy. A precipitate labour is more likely to occur with this than with an ordinary-sized pelvis.

Contracted Pelvis (*Æquabiliter Justo Minor Pelvis*).—

The justo minor pelvis is contracted, but not deformed. It is merely a small pelvis of normal shape. All the diameters are equally contracted. In some the contraction is very slight, and has little effect on labour,

while in others it may be sufficient to render labour very difficult.

The patient may be a small woman, but she is not necessarily so. Many small women have perfectly normal pelves. The intercrystal and interspinous diameters will be shorter than usual, but there will be an inch difference between them. The promontory will be reached with ease, and the diagonal conjugate found under $4\frac{1}{2}$ inches. The transverse diameters will be smaller than usual.

Labour in a justo minor pelvis is more difficult than in a normal one. The mechanism of labour is the same, only flexion must be very marked, to allow as small a diameter as possible to pass. Artificial delivery will very likely be necessary. These are typical cases for forceps. If forceps fail, and the child is still alive, a symphysiotomy may be done. If the child is dead, do a craniotomy. Cæsarean section will rarely be necessary unless the child is very large. If the head fails to enter the brim, and is evidently too large to pass, a section will be called for, if the child is alive. If great difficulty is experienced in delivering the child in the first labour, induction of premature labour should be done in subsequent pregnancies.

A Generally Contracted Rickety Pelvis is sometimes met with. The promontory will be pushed forward somewhat, so the conjugate diameter will be shortened, but there will not be the lengthening of the transverse diameter which is characteristic of a true flattened pelvis. The development of the pelvis has been interfered with by rickets, but the softening of the bones has not been sufficient to allow of great flattening of the pelvis.

Labour in such a case will be more difficult than in an ordinary flattened pelvis, because the transverse

diameter is too short to allow of the head moving towards its occipital end, to bring the bi-temporal diameter into the conjugate in place of the bi-parietal. The importance of this will be understood when the mechanism of labour in a flat pelvis is discussed.

In the majority of such cases Cæsarean section will be necessary.

Antero-posterior Contraction—Flat Rickety Pelvis.—

In this condition the pelvis is flattened from before backwards—*i.e.* the promontory is pushed forwards and the pubis backwards. The conjugate diameter at

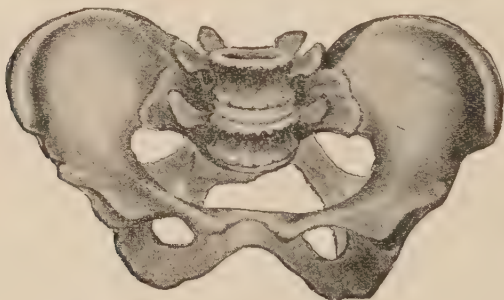


FIG. 23.—Flat rickety pelvis. (Fothergill.)

the brim is decreased, while the transverse one is increased. The brim is kidney-shaped, and its inclination is increased. The iliac bones are thickened and flattened out, so that the interspinous diameter, instead of being an inch shorter than the intercrystal, is equal to it, or even greater. The sacrum is flatter than in an ordinary pelvis, the ischial tuberosities are further apart, and the pubic arch is wider. The outlet is therefore increased in size. The contraction lies at the brim in the antero-posterior diameter, and it is there difficulty arises. Let the head once pass the brim, and there will be no difficulty at the outlet.

In the great majority of cases, flattening of the pelvis is due to rickets in infancy, but occasionally a non-rachitic flat pelvis is seen, which must be due to some



FIG. 29.—Deformity from rickets. Flat pelvis; Cæsarean section.

peculiarity in development, as no trace of rickets or other disease can be found. As already stated, we sometimes have more or less flattening from rickets in a generally contracted pelvis.

Rickets is a disease of the first and second years of life. The cartilaginous elements from which the bones



FIG. 30.—Side view of same case.

are developed grow rapidly, but at first there is a want of deposition of the mineral constituents, and the bones remain very soft, and any mechanical force

applied to them will cause bending. This is quite evident in the arms, legs, and spine, but the same



FIG. 31.—Back view of same case.

thing happens in the pelvis. The weight of the body is transmitted, as a downward force, along a line which passes through the promontory of the sacrum. The

force is transmitted from the sacrum to the pelvis, and then to the ground through the acetabula and legs in standing or walking, or through the ischial tuberosities in sitting. While the child is sitting, the downward force is partly spent in acting in the plane of the brim, and this tends to force the promontory forwards—*i.e.* to shorten the brim antero-posteriorly, and necessarily to widen it transversely. In the same way, sitting tends to widen the outlet. In standing, the upward pressure through the acetabula tends to force the sides of the pelvis inwards, and thus to narrow it transversely. As a rule, a rickety child cannot walk while the pelvis is soft, but in the disease, osteomalacia, which is one of adult life, the bones become very soft, and we have this forcing in of the sides of the pelvis. In some cases, however, the rickets occur when the child is walking, and we then have the acetabula forced in, giving rise to the tri-radiate or pseudo-malacosteon pelvis. If there is much lateral curvature of the spine, the weight of the body will be thrown to one side, and that side of the pelvis will be pressed in, giving rise to the scolio-rachitic obliquely contracted pelvis. With rickets we thus find a number of different deformities of the pelvis, but the flat pelvis is by far the commonest one.

Diagnosis of a Flat Pelvis.—In most flat cases the patient will show indication of rickets, in deformity of the limbs, etc., and the abdomen will be very prominent. The iliac crests will be felt to be thicker and less curved than usual. The intercrystal and interspinous diameters will be found to be nearly the same length. The head, if it presents, will be felt lying free above the brim, and if there is much contraction, it will overlap the top of the symphysis. On making a vaginal examination, the promontory will be reached with ease, and

the presenting part will be found lying above the brim. If it is the head, it will usually be lying transversely, with the anterior and posterior fontanelles on nearly the same level, and the sagittal suture in the transverse diameter of the pelvis, either near the symphysis or the promontory, according to which parietal bone is presenting. The membranes are liable to protrude in a sausage shape, and to rupture early.

Prognosis.—This will depend upon the amount of contraction, the relative size of the head, and the way in which it presents. If it is a case in which natural efforts can finish the labour in a reasonable time, the risks should not be very great. On the other hand, if artificial interference is required, the risk to the mother will be considerably increased, and may leave little or no hope for the child, who is doomed, if a destructive operation be required.

Mechanism of Labour in a Flat Pelvis.—This differs somewhat from that in an ordinary pelvis. The head usually presents with the occipito-frontal diameter in the transverse of the pelvis. The head is not flexed,



FIG. 32.—Anterior parietal presentation (from below).

so the anterior and posterior fontanelles are on a level. It is here we see the typical parietal presentations. The anterior parietal presentation is the most usual one (Figs. 32 and 33). The sagittal suture will be felt running transversely across the pelvis near the promontory. When the posterior parietal presents, the

sagittal suture will be felt near the symphysis (Figs. 34 and 35). The bi-parietal diameter of the head lies in

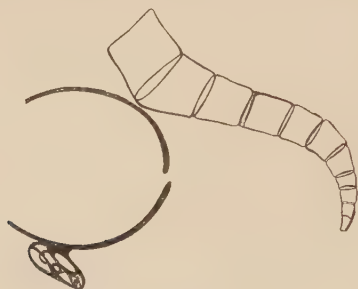


FIG. 33.—Anterior parietal presentation (from side).

the conjugate, but this is the longest transverse diameter of the head in the shortest diameter of the pelvis.



FIG. 34.—Posterior parietal presentation (from below).

To bring the bi-temporal or shortest diameter of the head into the conjugate, the fore part of the head dips



FIG. 35.—Posterior parietal presentation (from side).

a little, or extends slightly, and the head slips towards its occipital end. This is caused by the wedge shape of the head. If it is an anterior parietal presentation, the sagittal suture will be felt to pass nearer the promontory than it was when labour began, and the parietal bone will be felt coming down in the pelvis. When it has advanced a certain distance it becomes pivoted, as it were, on the symphysis, and the posterior side of the head is gradually driven down round the promontory. The sagittal suture will now be felt to come forwards. A groove or depression may be formed by the promontory, as the posterior side of the head rounds it. When the posterior parietal presents, it passes down into the pelvis, the sagittal suture travelling towards the symphysis, and it gets pivoted on the promontory, and the anterior side of the head is driven round the symphysis, the sagittal suture now passing towards the centre of the pelvis. The posterior side of the head may be indented by the promontory.

The rounding of the symphysis is much more difficult than that of the promontory, because the zone of resistance is greater, nearly the whole of the anterior side of the head being in contact with the anterior wall of the pelvis, while, in the other case, the only part of the head which is resisted, is that which is in contact with the promontory.

These backward and forward movements of the head are similar to the movements of a cork, when it is drawn from the neck of a bottle with the fingers, especially if you hold the bottle upside down. To imitate the movements in an anterior parietal presentation, first push the cork away from you; this brings the anterior side of the cork down a little, and represents the dipping of the anterior parietal bone into the pelvis. Next draw the cork towards you, and the posterior

side advances, the anterior one pivoting on the mouth of the bottle ; this imitates the rounding of the promontory by the posterior side of the head. To imitate the movements in the posterior parietal presentation, it will only be necessary to reverse them, pulling the cork toward you first, and pushing it away from you last.

After the head has passed the brim, the mechanism becomes much the same as in an ordinary pelvis. A certain amount of flexion will occur, and internal rotation of the occiput forwards, and extension. As the outlet is enlarged, the head will escape easily ; but, as the sacrum is straighter than usual, the perineum may easily be torn.

The anterior parietal presentation is a much more favourable one than the posterior. Fortunately it is the commoner of the two.

In the non-rachitic flat pelvis, where the transverse diameter of the pelvis is somewhat lessened, the head cannot extend or slip towards its occipital end ; it becomes extremely flexed, and passes down, as in a generally contracted pelvis. The posterior parietal bone will be grooved in a more or less longitudinal direction as it passes the promontory.

Treatment.—This will depend upon the amount of contraction, and the relative size of the child's head. If the true conjugate is $2\frac{3}{4}$ inches or less, there will be little hope of getting a live child through, unless the head is very small. If the child is alive, Cæsarean section should be done, as soon as the os is dilated sufficiently to admit a finger. If the conjugate is under 2 inches, Cæsarean section should be done, even if the child is dead, unless, indeed, it is macerated. If the conjugate is from 3 inches to $3\frac{1}{2}$ inches, and the head is not very large, delivery of a live child may be possible, either by forceps or turning, placing the patient in the Walcher

position while bringing the head through the brim. Symphysiotomy is a very suitable operation in such cases. If the child is dead, craniotomy should be done. At the present day one is rarely justified in doing craniotomy on a live child, unless there are strong reasons against either Cæsarean section or symphysiotomy.

When the case is first seen, one should decide as soon as possible on the method of delivery. If it is to be a Cæsarean section, the sooner it is done the better, before the woman becomes exhausted. If the case be under observation, I would do the operation before the actual pains set in—*i.e.* as soon as the cervix is taken up and the os will admit a finger. If it is decided to deliver through the natural passages, the membranes should be preserved as long as possible. If they rupture early, as they are apt to do, dilatation will be hindered, and in many cases will have to be done artificially, either manually, or by the use of Champetier de Ribes' or Barnes' bags. The bags are most useful in these cases, as they retain a certain amount of the liquor amnii in the uterus. The second stage should be allowed to go on for several hours, if there is a chance of the labour being finished by natural efforts, or if you have decided to use forceps. The patient, however, must be watched carefully, especially if the pains are strong, and on the first indication of thinning out of the lower uterine segment and the appearance of Bandl's ring, steps must at once be taken to deliver by forceps, symphysiotomy, or craniotomy, but never by version. If version is decided upon, it should be done at the beginning of the second stage, and never when the uterus is firmly retracted round the child.

How to test the size of the Head relatively to the size of the Brim of the Pelvis.—The size of the brim of the pelvis can be very easily estimated by the methods

already described, but how are we to estimate the size of the head? A cephalometer has been devised by Perret for this purpose. It can only be applied to the head through the abdominal wall, and the only diameter of the head which can be measured in this way is the occipito-frontal one, a diameter which is of very little importance. The important diameter for you to



FIG. 36.—Testing size of head relative to the brim.

estimate in a flat pelvis is the bi-parietal, and it cannot be measured by a cephalometer. It has been shown that the bi-parietal diameter is approximately 1 inch shorter than the occipito-frontal, but this is only an approximation. The best method of judging whether or not the head will pass through the brim is by actually testing how far it can be made to engage. By this method you are also able to estimate whether or not the head is likely to mould much.

It can be done without anæsthetizing the patient, but it is better to have her under chloroform. If the head is not presenting, it should be manipulated into the brim by external version. With the patient in the lithotomy position, pass the fore and middle fingers of the hand into the vagina, and bring the thumb up, over the front of the symphysis pubis ; then grasp the head through the abdominal wall with the other hand, and press it downwards and backwards into the brim. By the fingers in the vagina you will be able to estimate the amount of engagement, and also the hardness or softness of the head, while with the thumb over the symphysis you can judge the amount of overlapping (Fig. 36). If the head can be pushed well into the brim, you may be quite sure it will come through. If, on the other hand, it cannot be made to engage, and there is considerable overlapping, delivery in the ordinary way will be impossible, and you will have to decide whether a symphysiotomy or a Cæsarean section will be necessary. Experience alone will enable you to decide which of these operations should be done.

Forceps versus Turning.—At one time, turning was almost invariably done in flat pelves in preference to delivery by forceps, but since axis-traction instruments have come into use they are much more frequently used than the older forms were. There are certain cases in which turning will give the best chances of getting a live child through, while there are others in which, I believe, axis-traction forceps are preferable. If the pelvis is wider towards one side than the other, and if, by turning, you can bring the head through that side, then manifestly turning is preferable to forceps. Anterior parietal presentations are the ones which are most suited for forceps, just as they are the ones in which natural delivery most frequently occurs. Pos-

terior parietal presentations, on the other hand, are not suitable for forceps delivery, and, if possible, version should be done as soon as the os is fully dilated, and before the uterus has retracted round the child. In all cases, the Walcher position should be adopted while the head is passing the brim. In forceps deliveries, after the head has passed the brim, the instruments should be taken off and reapplied to the sides of the head, as the first grip will necessarily have been antero-posterior as regards the head. Care must be taken of the perineum, as it may very easily be torn. Antero-posterior forceps have been devised for these cases. The blades are applied to the sides of the head, and lie antero-posteriorly in the pelvis, but I do not think they are as useful instruments as the ordinary axis-traction ones. For one thing, it is impossible properly to apply the axis-traction principles to them. They are very powerful instruments, and mischief may be done with them.

Reasons why Forceps should be used in Anterior, and Version in Posterior Parietal Presentations.—Recall the mechanism of labour, and you will at once see that, in an anterior parietal presentation, the action of the forceps will exactly carry out the natural movement of the head, by swinging it forwards on its pivot on the symphysis, thus bringing the posterior side past the promontory. On the other hand, in a posterior parietal presentation the pivot is on the sacrum, and the natural movement is a backward swinging of the head, which cannot be carried out with the forceps. In fact, the forceps will carry the head in the opposite direction. I therefore maintain that in posterior parietal presentations version should be done, if the uterus is not moulded round the child, or else the presentation should be changed to an anterior one.

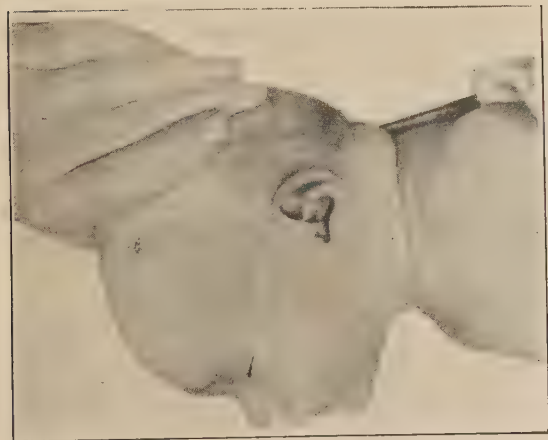


FIG. 33.—Same case after recovery from operation.

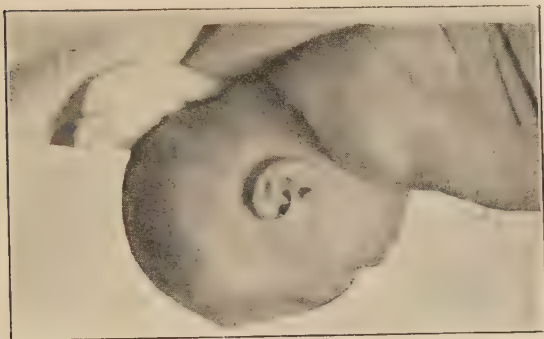


FIG. 37.—Depression of skull raised by operation.

In occipito-posterior positions of the head it is possible to change the position into an anterior one (see p. 52). The same thing may be done with posterior parietal presentations, by the following procedure. Pass your hand into the vagina and grasp the head, with the fingers on one parietal bone and the thumb on the other, and swing the head backwards, so as to bring the anterior parietal bone well into the brim, while the posterior parietal bone passes upwards and backwards. This can be done before the head is firmly fixed into the brim. The forceps should be applied as soon as the presentation is changed.

If the uterus is firmly retracted round the child, and you cannot change the presentation to an anterior one, do not attempt version, or you will rupture the uterus. Do a symphysiotomy, and deliver with forceps.

Injuries to the Skull, etc., during Delivery.—If there has been much difficulty in delivering the head, the portion of the skull which lay against the promontory will probably be found to have an indentation. This may be a spoon-shaped depression, or an ordinary depressed fracture. The spoon-shaped depressions usually rise of themselves in a short time, but they can be elevated at once, by compressing the head antero-posteriorly. This should be done at once, to relieve pressure upon the brain. If it is a depressed fracture, it cannot be raised in this way. The brain may be lacerated, and this will probably cause the child's death. Immediate elevation by cutting down and inserting a probe or periosteum elevator under the bone, above the dura mater, has been done successfully in a number of cases (Fig. 37). It should be done with strict aseptic precautions. Where the child shows difficulty of breathing, elevation of the bone usually relieves it very quickly. In some cases, there may be no injury

to the skull, but meningeal hæmorrhages, or hæmorrhages into the brain substance, may cause the death of the child. These occur more frequently when the head has come last. If the child recovers, it may develop imbecility. It is difficult to say how often imbecility may be traced to injury during birth, but I have certainly seen it follow in a marked degree in one case, and in a lesser degree in another.

Injury to the eye is sometimes caused. This may be by the blade of the forceps, or by the promontory crushing the temple and fracturing the orbital plate.

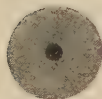


FIG. 39.—Opacity of the cornea showing two vertical bands. Patient aged eight weeks. (Drawn by Dr. Ballantyne.)

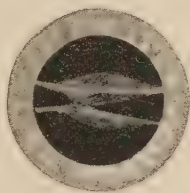


FIG. 40.—Opacity of the cornea showing two transverse bands. Patient aged four months. (Drawn by Dr. Ballantyne.)

The eye may be completely enucleated. Opacity of the cornea sometimes occurs from the pressure. It may render the whole cornea opaque, but in all cases observed by me there has been a linear denser opacity, about the centre of the cornea, usually running up and down, but occasionally transversely (Figs. 39 and 40). In several cases, I observed this linear density immediately after the birth of the child. The condition is evidently caused by pressure. The posterior layer of the cornea is burst, and the aqueous humour affects the corneal tissue and causes the opacity. It clears up to a large extent, but, the linear opacity tends to remain. Hæmorrhages may occur into the anterior chamber of

the eye, under the retina, or conjunctiva, or even into the optic nerve.

With flat pelves, as with other abnormal ones, mal-



FIG. 41.—Congenital dislocation of both hips. From a photograph lent by Dr. Fothergill.

presentations are common. The most frequent malpresentation is transverse. It should be dealt with by version, but this should never be attempted if the uterus is retracted round the child, as rupture of the

uterus will be caused. An embryulcia or decapitation should then be done. If the face presents, version should be done early, but if the face is jammed in the



FIG. 42.—Side view of same case. From a photograph lent by Dr. Fothergill.

pelvis, forceps should be tried, and if these fail, craniotomy. Of course, if cases of abnormal presentations are seen in time, and the contraction is marked, Cæsarean section should be done,

The cord is very liable to prolapse in contracted pelves. It should be dealt with in the usual way.

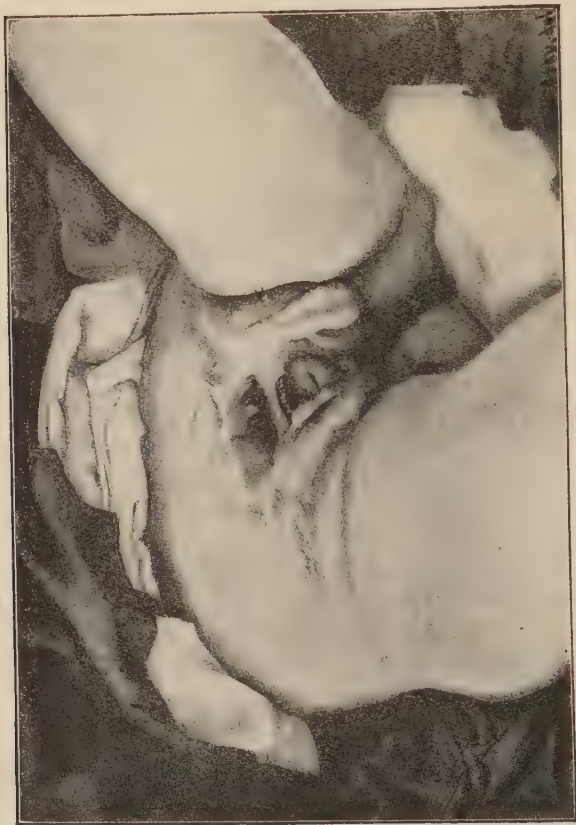


FIG. 43.—Extroversion of bladder and split pelvis.

The Pelvis of Congenital Dislocation of both Hips.—

The abnormal position of the heads of the femora on the dorsa ilii causes a considerable widening of the pelvis transversely, both at the brim and outlet. The conjugate will be relatively shortened. At the outlet,

the tubera ischii are wide apart and the pubic angle much increased.

If the dislocation is on one side only, that side of the pelvis will be widened, and the symphysis be pulled a little towards the same side.

There is not likely to be any difficulty with the labour.

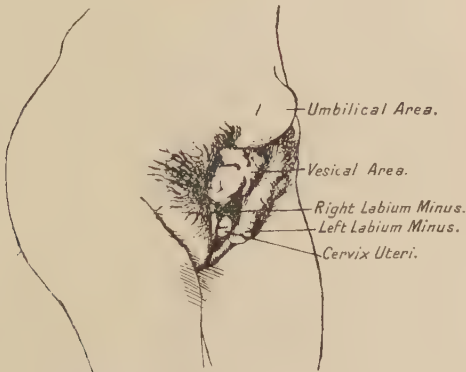


FIG. 44.—Extroversion of the bladder and split pelvis: semi-profile view in outline.

Split Pelvis.—In this pelvis there is a congenital absence of the symphysis pubis, and the bones are connected by a fibrous band. The pressure of the femora rotates the innominate bones about the sacrum, so that the posterior iliac spines approach each other. The sacrum slips forwards and downwards, and in extreme cases it looks as if the pelvis were inverted. The pelvis is flattened and widened much, as in rickets. It is usually associated with extroversion of the bladder, and therefore pregnancy is exceedingly rare. The gap in front allows of delivery without difficulty, but the perineum is usually torn.

Spondylolisthetic Pelvis.—In this condition, the last

lumbar vertebra has partly slipped down in front of the promontory, and thus partially blocks the brim. This may be the result of sudden or continued strain, when the body of the last lumbar vertebra has not ossified properly, or has become weakened by caries. If the last lumbar vertebra is defective, and the person goes about, and especially if she attempts to do heavy work, the downward pressure will cause the body to slip forwards gradually, or suddenly. The body of the



FIG. 45.—Spondylolisthetic pelvis. (Fothergill.)

vertebra forms a blunt wedge, with its base in the brim of the pelvis. It becomes ossified in its new position, and the new bone formation further blocks the brim.

The effect upon the sacrum is to displace its upper part backwards, and bring the lower part and the coccyx forwards. The backward pressure of the sacrum separates the iliac bones, and widens the distance between the posterior superior iliac spines. The inclination of the pelvis to the horizon is diminished, and

increased strain is thrown upon the ilio-femoral ligaments, and the upper part of each innominate bone is pulled outwards, while the lower part goes inwards. The transverse diameter of the pelvis is thus widened at the brim and narrowed at the outlet. At the brim the conjugate is lessened and the transverse increased, while at the outlet the conjugate and transverse are both lessened.

The patient's body is deformed. The spine is shortened, and there is great lordosis. In a bad case, the lower ribs will be found sunk into the false pelvis. The patient walks with very short steps, and the feet are slightly inverted.

Diagnosis.—From the history and external appearance of the woman, you may form a pretty accurate notion of the deformity. A vaginal examination will reveal that the conjugate at the brim is narrowed by the projecting forwards of the last lumbar vertebra. This false promontory will be very easily reached. At the outlet, the ischial tuberosities will be found closer together than in a normal pelvis, and the sacrum and coccyx will project well forwards. The condition at the outlet is the same as that found in a kyphotic pelvis.

Prognosis.—It is a more serious deformity than a flat pelvis with an equal contraction at the brim, because the outlet is also contracted.

Treatment.—This depends upon the degree of deformity, which can be estimated by the length of the conjugate. The shorter this is, the greater will be the deformity at the outlet. Artificial delivery will, as a rule, be required. The method of delivery will depend upon the amount of contraction. If the head cannot be pushed into the brim, do a Cæsarean section as early as possible, provided the child is alive.

CHAPTER IX.

CONTRACTED PELVES—*Continued.*

COMPRESSED PELVIS.

Malacosteon or Osteomalacic Pelvis.—Osteomalacia is a disease rarely seen in Britain, but it is endemic in certain parts of Europe and in hot climates. I have only seen two cases of it. It produces extreme softening of the bones, and, as it occurs in adults, the pressure of the body-weight and the pull of the muscles will cause excessive deformity of the pelvis. When standing, the body-weight presses the promontory forwards, and the upward pressure through the acetabula forces the sides of the pelvis inwards. When sitting, the pressure upon the ischial tuberosities forces them inwards, and the sacrum doubles upon itself. The pubes give way and bend inwards at the thin part of the superior rami, and the sides of the arch also approach, thus forming the rostrum or beak. In the false pelvis the iliac bones bend and assume a scoop shape. The inlet of the pelvis assumes a Y or tri-radiate shape, hence the name tri-radiate pelvis. From the projection forwards of the rostrum, the true conjugate may not be much, if at all, shortened, but the available portion of it—*i.e.* from the back part of the rostrum to the promontory—may be exceedingly short.

This description does not apply to all osteomalacic pelves. In some, the doubling-up process may be much greater on one side than the other, if the bones are not

symmetrically softened, or if, for any reason, greater weight be thrown on one side of the pelvis than on the other. In such a case, obliquity will be added to the deformity.

Diagnosis.—The disease is accompanied by severe pain, especially on movement. The other bones besides the pelvis suffer, so the spine bends. The patient suffers from severe muscular cramps, and probably suffocative attacks, shortness of breath, and cough. On making an examination, the bones will be found to



FIG. 46.—Malacosteon pelvis. (Fothergill.)

be tender and soft. The deformity will be easily recognized, and it may be possible to force the bones apart with the hand. In a case where the actual disease has occurred prior to the pregnancy, the bones may have become hardened in their abnormal shape, and then you cannot separate them.

Treatment.—If the disease is active and the bones are soft, the pelvis may be sufficiently opened up by the hand to allow of delivery, and this should be tried. If this is impracticable, an abdominal section should be done. If an ordinary Cæsarean section is done, the ovaries should be removed, as this will check the dis-

ease; but it is preferable to remove the uterus and ovaries by Porro's operation, or any of its modifications.

Pseudo-malacosteon Pelvis.—The deformity very much resembles that of the true malacosteon pelvis, but is not so great. It is caused by pressure acting on the softened pelvis, but the softening in this case is due to late rickets, occurring when the child is running about. The false pelvis will show some of the characteristics of the rickety flat pelvis, as the

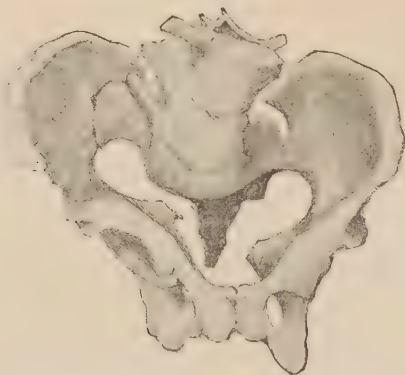


FIG. 47.—Pseudo-malacosteon pelvis. Author's case.

iliac bones will not be crumpled in, but flattened out so that the iliac spines will be far apart (Fig. 47).

Treatment.—In an extreme case, Cæsarean section should be done. Removal of the ovaries or uterus is not necessary, as the disease would not be lessened. If it is considered advisable to sterilize the patient, the tubes should be tied and cut. In slight cases, delivery may be possible by forceps or turning. The bones are quite fixed, and it is impossible to widen the passage, as in true malacosteon.

TRANSVERSE CONTRACTION.

Kyphotic Pelvis.—In kyphosis, or angular curvature of the spine, there must be a compensatory curve, or the body would fall forwards. When the angular curvature is high up in the spine, the compensatory curve in the lumbar region will cause great lordosis. This will not alter the shape or size of the pelvis, but it will have an adverse influence on labour, by causing deviation of the uterine axis. When the curvature is low down, a change in the inclination of the pelvis gradually takes place, and its shape is altered. The lower lumbar and upper sacral vertebræ are drawn back, thus increasing the conjugate, and relatively shortening the transverse diameter.

The iliac bones are straightened, and the anterior superior spines thrown apart.

The true pelvis becomes funnel-shaped. The outlet is shortened antero-posteriorly, by the tilting forwards of the lower end of the sacrum and coccyx, and markedly so, transversely, by narrowing of the pubic arch and turning in of the ischia. We thus see that the main contraction is at the outlet, and it is there that the chief obstruction will be met with in delivering.

Diagnosis.—The sharp, angular curvature of the lumbar spine will suggest the condition. The promontory will be very difficult to reach, but the contraction at the outlet will be easy to make out.

The mechanism of labour in the upper part of the pelvis is much as in an ordinary pelvis. The occiput may be turned forwards before it reaches the floor of the pelvis, the rotation being caused by the bones of the pelvis, if the deformity is not marked, but if there is marked narrowing of the pubic arch, it cannot turn forwards, as there is not room for it. It then passes

behind the ischial tuberosities, and, if it be small enough, will be expelled in an oblique diameter, pressing strongly against the coccyx, which may be broken. The perineum is very apt to be torn.

Treatment.—The difficulty will be at the outlet, and forceps will usually overcome it. Turning is not suitable. If forceps fail, and the child be still alive, symphysiotomy may be tried. Craniotomy would, perhaps, be preferable, and induction of labour in subsequent



FIG. 48.—Robert's Pelvis. (Fothergill.)

pregnancies is to be recommended. Except with very extreme contraction at the outlet, Cæsarean section is not necessary.

Robert's Pelvis.—This is an exceedingly rare deformity of the pelvis. Both sacro-iliac joints are ankylosed, and the wings of the sacrum are wanting. The iliac bones are straighter than in an ordinary pelvis. The promontory is pushed slightly forwards. The brim is thus markedly contracted in the transverse, and slightly in the conjugate, diameter. At the outlet, the tuber ischii are inverted, and the pubic arch narrowed.

Diagnosis.—By external and internal measurements, the condition can be easily recognized.

Treatment.—The delivery of a live child through the natural passages is impossible, therefore, Cæsarean section should be done.

Infantile Pelvis.—In these cases, the pelvis is long in the conjugate, but narrowed transversely, and funnel-shaped in the cavity. The foetal type has been maintained. The genital organs are defective in development, so that pregnancy is not likely to occur.

Funnel-shaped or Male Pelvis.—In this form, the pelvis develops in the shape of a male pelvis. It is deeper and somewhat narrowed transversely, especially at the outlet. The sacrum is longer and narrower than usual, and the promontory higher. The difference between the diagonal and true conjugate may be an inch, or even more.

Diagnosis.—This can only be made by careful internal measurements. The chief contraction will be found at the outlet in the transverse, and this diameter is exceedingly difficult to estimate.

Treatment.—The chief difficulty is at the outlet. Forceps will generally overcome this, and if these fail and the child is alive, symphysiotomy can be done, or, in the last resort, craniotomy. In subsequent pregnancies, induction of labour will be advisable.

If the contraction at the outlet is very marked, Cæsarean section should be done, if the child is alive.

OBLIQUE CONTRACTION.

Scoliotic Pelvis.—Lateral curvature of the spine will cause an oblique contraction of the pelvis, by the greater part of the body-weight being thrown upon the side of the pelvis, towards which the curvature lies.

This side of the sacrum is driven upwards, and the pressure upwards through the acetabulum, when the patient stands, pushes that side of the pelvis inwards. The pubic symphysis is pushed towards the opposite side. The ischial tuberosity of the contracted side is everted. The oblique diameter, measured from the contracted side to the opposite sacro-iliac joint, is considerably shortened at the brim. The other oblique diameter is considerably larger.



FIG. 49.—Scolio-rachitic pelvis. (Fothergill.)

As scoliosis is generally associated with rickets, there is likely to be more or less flattening of the pelvis as well, giving the **scolio-rachitic pelvis**.

Diagnosis.—Lateral curvature of the spine, especially in a rickety subject, will at once suggest the deformity, and an internal examination will confirm the diagnosis.

Treatment.—In slight cases there may be no difficulty in the delivery. In some cases forceps may succeed, but, if the deformity is at all marked, Cæsarean section

should be done. Induction of labour may be done in some cases. Symphysiotomy is not applicable.

Naegele Pelvis.—This is a typical obliquely contracted pelvis, due to defective development of one wing of the sacrum, and ankylosis of that sacro-iliac joint. It is a developmental condition, and not due to disease, but a somewhat similar condition may be brought about by disease in infancy, causing ankylosis. It is the same condition as is found in Robert's pelvis,



FIG. 50.—Naegele pelvis. (Fothergill.)

but, in the latter, both sides of the sacrum are affected, and the contraction is symmetrical. The weight being thrown upon the defective side increases the deformity. The pubic symphysis is pushed over towards the sound side.

Diagnosis.—The iliac crests will be found asymmetrical, and the symphysis pushed beyond the middle line. By a careful internal examination, the asymmetrical shape of the pelvis can be made out.

Treatment.—If the head is small, it may come through

the wide side of the pelvis much flexed, as in a generally contracted pelvis, but forceps are likely to be required. Turning is not applicable, neither is symphysiotomy. Embryulcia or Cæsarean section should be done when the child cannot come through. Induction of premature labour about the seventh month may give good results.

Coxalgic Pelvis.—Disease of the hip-joint in childhood will cause deformity of the pelvis, by interfering with the nutrition of the bones of the diseased side, also by the non-use of that leg, and often there is dislocation of the femur. There may be a considerable amount of new bone formation, encroaching upon the pelvic canal. The amount and nature of the deformity will depend upon the severity of the disease, and the age at which it affects the patient.

Before attempting to deliver, a most careful estimate of the condition must be made by internal examination. It is not sufficient to estimate the conjugate alone, but the side corresponding to the diseased hip must be very carefully examined.

If the obstruction is at all marked, Cæsarean section should be done. If the head is dragged by the mass of new bone formation, the cervix or lower part of the uterus may be perforated.

Obstruction from Tumours of the Pelvis.—Various bony tumours may affect the pelvis and cause serious obstruction to labour. These may be simple or malignant. The simple may be exostoses, single or multiple; masses of callus, as in cases of old-standing hip-joint disease or after fractures of the pelvis; the result of rheumatoid arthritis; or ossification of the insertions of ligaments and tendons. The malignant may be of a cancerous nature, but, more frequently, sarcomatous (Fig. 51).

The amount of obstruction will depend upon the size, number, and situation of the tumours. The brim is the part most liable to be affected. The malignant tumours are the ones most likely to cause serious obstruction, as they grow very rapidly during pregnancy. They may cause the death of the patient during pregnancy.

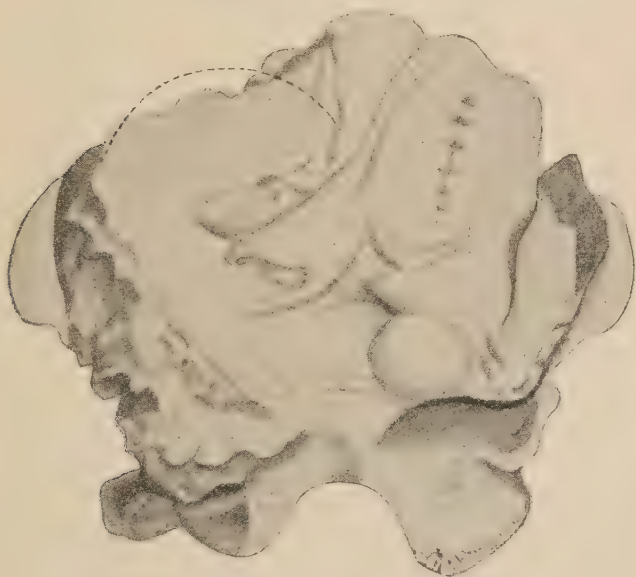


FIG. 51.—Sarcomatous enchondroma of the pelvis. The growth lies to the right, the sutured uterus to the left.

The simple ones will not influence the pregnancy, but they may seriously affect the delivery.

Prognosis.—With a malignant tumour, the prognosis is hopeless for the woman. It will at the best be only a question of time. She may live some time after delivery, but it cannot be long. With simple ones, the risk to the woman is much less.

Diagnosis.—This can only be made by careful ex-

ploration of the pelvis, both by the vagina and the rectum.

Treatment.—If there is room for the child to pass, delivery may be effected by forceps, but if the projections are at all sharp, one must be exceedingly careful, lest the cervix or lower part of the uterus be perforated. If there is any risk of this, or no room for the child to pass, Cæsarean section should be done, if the child is alive, or craniotomy, if it is dead. Induction of labour may be suitable in some cases.

CHAPTER X.

DELAY CAUSED BY THE RETRACTION RING.

THE retraction, or Bandl's, ring is a muscular ring, which marks the junction of the passive lower uterine segment with the active or retracting part of the uterus. The lower uterine segment is the part of the uterus which, during labour, does not contract, but becomes stretched and thinned out. The whole of the uterine wall above this segment is active during labour, and it not only contracts, but it also retracts and thickens. The difference between the two segments during labour is, that the lower one is passive, and it stretches and thins out ; while the upper one is active, and it contracts, and also retracts and thickens.

Retraction and **Contraction** are terms which are frequently used in describing labour. They refer to what takes place in the muscular fibres of the uterus, but they are not synonymous terms. In an ordinary muscle, when a contraction occurs, the fibres shorten and thicken, but with relaxation the fibres return to their original length from the elastic recoil. During labour, the uterine muscular fibres in the active part of the uterus do not act exactly in this way. With each pain or contraction, the fibres shorten and thicken, as in any other muscle in the body ; but when relaxation occurs, the fibres do not return to their original length. They remain somewhat shortened and thickened. This shortening and thickening is what is known as **retrac-**

tion. In an ordinary muscle it is only transient, passing off with relaxation ; but in the uterine muscle, during labour, it is permanent and progressive. Now, as the lower uterine segment stretches and thins out, and the upper segment thickens, manifestly, at the junction of these two segments, a ledge or ring must form, and this is what is known as the **retraction** or **Bandl's ring**. Its position varies according to the amount of retraction which has occurred. The junction of the lower uterine segment with the retracting portion of the uterus, at full time, is from $2\frac{1}{2}$ to $3\frac{1}{2}$ inches above the internal os. The peritoneum is very loosely attached to the lower uterine segment, but closely attached to the retracting part of the uterus, and, where the firm attachment begins, the ring forms. Just at this point there is a circular vein in the uterine wall.

In an ordinary labour, the retraction of the upper part of the uterus is not so marked that the ring can be palpated through the abdomen, but, in an obstructed labour, its presence can be ascertained by palpation, if the second stage has gone on for a considerable length of time. If it is at all marked, a sulcus can be seen running across the abdomen, between the umbilicus and the pubes. It is generally nearer the umbilicus than the pubes, and the higher it is, the greater the danger. It may be transverse, or more or less oblique. A very similar appearance is presented when the bladder is distended (Fig. 7), but by palpation, it is easy to distinguish between the two conditions. If it is a full bladder, the fluid can be detected, and the sulcus disappears when the bladder is emptied.

In Fig. 52 the ring is distinctly shown as a ledge, passing partly round the interior of the uterus. The specimen was obtained from a patient who died of incomplete rupture of the uterus a few minutes after

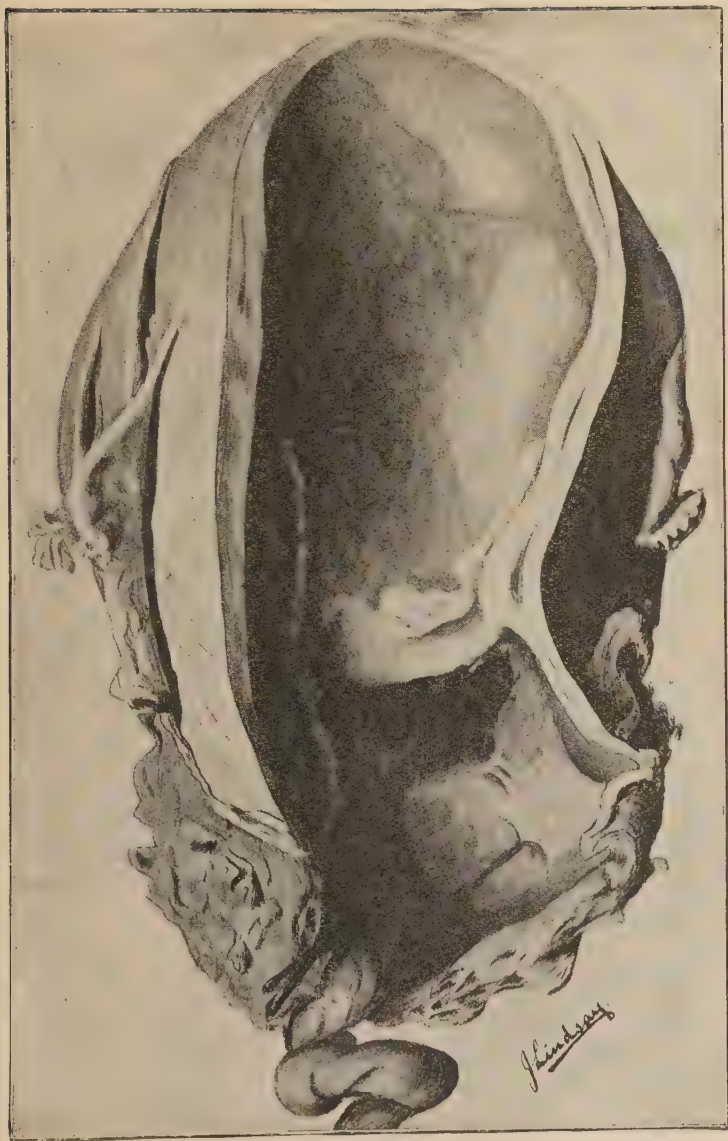


FIG. 52.—Partial rupture of the uterus showing the retraction ring.

admission to the hospital. The child had presented by the face, mento-posteriorly, and, after frequent ineffectual attempts to deliver with forceps, version had been tried, and the back of the operator's hand had ruptured the thinned-out muscular layer of the lower uterine segment. Profuse bleeding occurred under the loose peritoneal layer. The ring had been noticed by the operator, but, unfortunately, he had not recognized what it meant. The rupture is the exact shape of the back of a closed hand. It is just below the ring.

In an obstructed labour, when the ring can be seen or palpated through the abdomen, it is a danger signal which must not be disregarded. Prompt and proper treatment must be quickly adopted, or rupture of the uterus will soon occur. In such cases, the ring is not the primary cause of the obstruction, but rather the result. Occasionally, however, cases occur in which the ring itself is the cause of the obstruction. I have already dealt with this, in reference to breech cases with extended legs, but there is a much more dangerous condition, in which the ring forms in front of the presenting part and causes obstruction. I have seen two such cases, one under the care of Prof. Cameron, and the other under my own care. In both of these cases the pelvis was contracted, but not to such a degree that the children might not have been delivered by forceps. As a matter of fact, we had both decided on this method of delivery. In Prof. Cameron's case, when we examined the patient, the membranes had been ruptured for some time. The ring was distinctly felt as a ledge running round one side of the uterus, about 3 inches above the external os. In my case, the membranes were intact and the os was well dilated, but there was a well-defined ledge, round about half of the canal, in front of the head. The ledge was very like the

one shown in Fig. 52. Both patients were put deeply under the influence of morphia, but in neither was there any relaxation of the ring, so Cæsarean section was performed, and the mothers and children did well.

My case was a specially interesting one, as the patient was in the hospital for some time under observation. She was a v-para, and her four children had all been born dead, but only the fourth one had reached full time. It had been delivered with forceps, and had evidently perished during birth. The pelvis was slightly flattened. The inter-spinous diameter was $10\frac{1}{4}$ inches, the inter-cristal 11 inches, and the diagonal one $4\frac{1}{8}$ inches. The true conjugate was just about $3\frac{1}{2}$ inches. The patient came to see about induction of labour, but, as the head could be easily made to enter the brim in the beginning of the ninth month, I decided to allow her to go to full time, and, if necessary, to do a symphysiotomy or a pubiotomy. She was admitted to my wards about a fortnight before the labour was due. At that time the head lay well above the brim, but in a few days it lay so that it could be pushed into the brim, and it seemed as if it could be born without much difficulty. The cervix was now taken up, and the os admitted two fingers. About the time labour was due, pains came on, but they ceased after a few hours. To hasten matters, the largest-sized Barnes' bag was inserted late in the afternoon, and uterine contractions were soon set up. In the evening the bag was expelled, and strong pains continued throughout the night. Next day, about noon, I examined the patient, and found the os dilated and the bag of membranes protruding. The lower uterine segment was opened up, but at the top of it, fully 3 inches up, there was a very distinct ledge, running round about one-half of the cavity. The head lay above the ledge and quite out of the brim of

the pelvis. The ledge prevented the head being pressed into the brim. The patient was given a large dose of morphia, but $3\frac{1}{2}$ hours later there was no change in the condition, so I did a Cæsarean section, and, as the patient and her husband desired that future pregnancies should be prevented, I tied off and removed about an inch of both Fallopian tubes.

Cases have been recorded where there was obstruction from the retraction ring, although the pelvis was normal. In some of them the membranes had been ruptured, but in others they had been intact, as in my case. In some of the cases with intact membranes, the bag had actually bulged well into the vagina. In my case, this was so. I have also seen several cases in which the pelves were normal, and the retraction ring was the obstructing factor, but it had not formed in front of the presenting head, but behind it, round the neck, thus preventing the delivery of the body, until both head and body were broken up. In impacted breech cases with extended legs, it forms above the presenting breech, but the feet are above it, and descent of the child is prevented. I have already dealt with this in chapter VI. In a number of my Cæsarean sections, in which the membranes have been ruptured for some time, I have found the ring present round the neck of the child. In such cases, if the ring is not divided, considerable force is necessary to deliver the head.

Causes.—In obstructed labours, as from a contracted pelvis, a tumour, or a malpresentation (*e.g.* a transverse one), it is easy to understand the formation of the ring, as it is due to the great retraction of the main body of the uterus, and the excessive thinning out of the lower uterine segment. Why the ring should form when there is no obstruction, and even before the mem-

branes have ruptured, is another question, and one which it is difficult to answer. Its formation has been ascribed to the use of dilating bags. In my case, a bag was used, and possibly it may have been the cause, but I have used dilating bags scores of times without any such result. Another cause which is given is the use of ergot. Undoubtedly, the hour-glass contraction of the uterus, which occasionally occurs during the third stage of labour, is generally due to the use of ergot. The two conditions are the same, the only difference being that in the latter the child is born, and only the placenta and membranes remain in the uterus. At the present day, ergot is not generally used in either the first or second stages of labour, but it may have been used in some of the recorded cases. It had not been used in any of the cases I have seen.

In the first stage of labour, we occasionally meet with a spasmodic condition of the os, where the circular muscular fibres round it have not been inhibited, and they contract along with the fibres of the body of the uterus, and the os actually gets smaller with each pain. This condition has already been dealt with on page 14. The internal os and the retraction ring are not quite analogous, but there is a strong resemblance between them, so strong that it is only within comparatively recent years that the two have been recognized as separate structures. It seems to me that the causes of spasmodic contraction of the os may quite well act upon the retraction ring in certain cases. These causes are generally supposed to be of an irritant nature.

In obstructed labours, it is quite easy to explain the presence of the ring, as it is due to excessive retraction of the main body of the uterus, and thinning out of the lower uterine segment. In such cases, it naturally follows that there must be a palpable ledge, where the

thinned-out lower uterine segment becomes continuous with the retracted thickened main portion of the uterus. By an internal examination, the ring can be recognized before it can be palpated through the abdomen. This is well seen in impacted breech cases.

Diagnosis.—In cases in which there is no apparent obstruction, as from a contracted pelvis or a transverse presentation, the labour is delayed, although the uterine contractions are strong. The uterus may be in a tetanic condition, without any relaxation between the pains. In the cases in which the retraction ring is below the presenting part, it may not be palpable through the abdomen, but, on making a vaginal examination, a distinct ledge will be felt above the position of the internal os, in front of the presenting part. Below the ledge, the lower uterine cavity is well opened up. The ledge may extend right round the cavity, but, in the two cases which I have seen, it only extended about half-way round. When it is above the presenting part, especially if that part be the head, it can be recognized through the abdominal wall as a sulcus, somewhere between the pubes and the umbilicus. The height of it will depend upon the amount of retraction present. It may be quite transverse, but in many cases it is more or less oblique. When the head presents, it is difficult to reach the ring by an internal examination, as the hand must be passed above the head, and in doing this there is great risk of rupturing the thinned-out lower uterine segment. When the breech presents, it can be reached with tolerable ease, by passing the fingers up by the side of the breech. In these cases it can be recognized by an internal examination, before it is palpable through the abdomen. In two cases of impacted breech, which I have seen in consultation, the men in attendance both mentioned to me that they had found

a ledge, inside the uterus, which was causing the obstruction.

Prognosis.—The condition is an exceedingly dangerous one for both mother and child. If it is recognized early, both may be saved, by proper treatment; but, unfortunately, in many of the recorded cases, a definite diagnosis had only been made when exhaustion had set in. In impacted breech cases, early recognition is easy, and there should be little risk to the mother. To the child, the risk is somewhat greater than in an ordinary breech case.

Treatment.—When the ring is below the presenting part, and there is no other obstruction, try to obtain relaxation, by the administration of full doses of morphia. When the patient is deeply under the influence of morphia, if the ring has not relaxed, give her an anæsthetic and try manual dilatation. Incision of the ring has been advised, but I am strongly opposed to this, as the risk of extension of the incision is too great. If you fail to dilate manually after the use of morphia, Cæsarean section should be done, if the child is alive. If the child is dead, and if there is sufficient dilatation to allow of the passage of the diminished head, do craniotomy. If the ring is very marked, it will be safer to do a section, even when the child is dead.

In my case, I did not try manual dilatation, as, in addition to the ring, we had to deal with a contracted pelvis, and through it the delivery of an unmoulded head would probably have caused the death of the child.

When the ring is above the presenting part, in the majority of the cases there is another obstruction, such as a contracted pelvis, a tumour, or a transverse presentation, and such cases should be dealt with according to the rules laid down for the treatment of such obstruc-

tions. With a contracted pelvis or a tumour, Cæsarean section is, undoubtedly, the proper treatment, if the child is alive; but if it is dead, craniotomy may be preferable. In a transverse presentation, when the ring is well formed, the child will be dead, and decapitation should be done. In such a case, version should never be attempted, as it is almost sure to end in rupture of the uterus. These cases have been fully dealt with in chapter VII.

In the rare cases in which there is no other obstruction and the head is below the ring, give full doses of morphia, and, if the child is alive, try to deliver with forceps under deep anæsthesia. If you fail, do not attempt to do version, but do a Cæsarean section. A Cæsarean section after failure to deliver is a more dangerous operation than one which is done on a case which has not been meddled with, but if proper precautions have been taken, the risk should not be much increased. If you fear that the uterus has been infected, do a hysterectomy. The alternative to a section is a craniotomy, and probably an embryulcia. The body is the part which is held by the ring, and to get at it, to lessen its bulk, the head must first be broken up. Such an operation is an exceedingly difficult one, and fraught with great danger to the mother, and, of course, the child is destroyed. In some cases, cutting the clavicles may be sufficient to allow the body to come through.

I have delivered four such cases, and the case of incomplete rupture of the uterus, from which the drawing showing the retraction ring was made (Fig. 52), I believe, was another. Three of the cases were admitted to hospital, after repeated attempts at delivery, in two by forceps, and in the third by version. All the patients had very roomy pelves, and they were all large women, two of them exceptionally stout. As the children were

dead, I delivered them by embryulcia. Of all the difficult deliveries I have had to deal with, these were certainly the worst. All the cases were infected on admission, and only one of them recovered. The one in which version had been tried died of shock, and the other one of sepsis. The fourth case, I saw in consultation. The ring could be felt extending right round the neck of the child. As the child was dead, I did a craniotomy, and my combined instrument held so firmly that I was able to overcome the resistance, and to deliver without cutting the clavicles or breaking up the body. The ring contracted on the placenta, and we had a typical hour-glass contraction in the third stage. The patient recovered.

In impacted breech cases with extended legs the treatment is much easier. Under deep anæsthesia, bring down one of the extended legs, by sweeping it over the child's abdomen, and make traction upon it. As you draw the body down, have firm supra-pubic pressure applied, to prevent the arms going up or the head being extended. In these cases, traction upon the breech with forceps, a fillet, or even a blunt hook will fail. A blunt hook should never be used on a live child. I have seen a case, where a man had used all the force he could with a blunt hook to no effect, and yet I was able to deliver the child in a few minutes by bringing down a leg. It was alive, but there was a considerable tear in the fold of the groin which required stitching.

The treatment of impacted breech cases is fully dealt with in chapter VI.

CHAPTER XI.

DELAY AND COMPLICATIONS IN THE THIRD STAGE OF LABOUR.

THE third stage of labour begins when the child is born, and ends with the expulsion of the placenta and membranes. It may only last a very few minutes, but twenty minutes may be taken as its normal length. If it is not over in half an hour it may be regarded as delayed.

Causes of Delay.—As in the other stages, the delay may arise from faults in the powers, passages, or passenger.

Faults in the Powers.—As in the second stage, the commonest cause of delay in the third stage is **uterine inertia**, which usually arises from exhaustion of the uterine muscle, through prolongation of the first or of the second stage. In constitutionally weak patients, and in those who have borne a number of children in rapid succession, it may continue throughout the third stage after having been present during the other stages. In fact, the same causes act in the third stage as in the first and second. It is very likely to arise after rapid emptying of the uterus, when it is in a state of inaction, unless proper means are taken to stimulate uterine action. After the child is born, there is usually a short period of rest, until the uterine muscle regains tone, and then contractions begin, and retraction gradually increases, until the placenta and membranes

are separated and expelled into the vagina. The secondary powers then complete the expulsion, but, if they are at fault, the placenta may be retained in the vagina, and in many cases of supposed retention the placenta is not in the uterus, but in the vagina.

Faults in the Passages.—In a contracted pelvis, or in a case with a tumour in the lower part of the uterine wall, the placenta may be retained after separation, by the promontory or tumour partially obstructing the

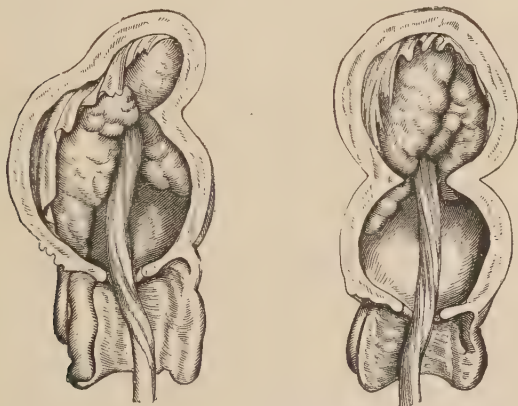


FIG. 53.—Hour-glass contraction of the uterus. (Play fair.)

passage ; but a much more serious fault is **hour-glass contraction of the uterus**. The uterus is constricted about its middle, and the placenta is partially or entirely retained in the portion of the uterine cavity above the constriction. The constriction is really at the retraction ring, and not at the internal os. The lower uterine segment and the cervix remain relaxed. In most of the cases, the condition is caused by the administration of ergot. Occasionally, the cervix contracts and causes retention of the placenta, but this can only occur when the placenta has been retained by adhesions for a con-

siderable time, so that retraction of the cervix has had time to occur. It is not the primary cause of the retention. It will be necessary to dilate the cervix before the placenta can be removed. It is more common in miscarriages than with full-time labours.

Faults in the Passenger—Adherent Placenta.—This condition is due to disease of the placenta or of the decidua, which prevents separation taking place in the usual way. The placenta is much more fibrous and tough than usual. The extent and firmness of the adhesions vary. It may be completely adherent, and no bleeding will occur, until you begin to separate it. If the adhesions are slight, manual separation will be easy ; but if they are very firm, it cannot be peeled off with the edge of your hand. You will require to remove it bit by bit, and portions may easily be left behind, and the uterine wall may be injured. Occasionally, it is so adherent that it is impossible to distinguish between placenta and uterine wall. In partial adhesion, if the upper part only is adherent, the lower part will separate and bleeding will occur, as retraction of the lower part of the uterus will be interfered with, and the sinuses will remain open. If the lower part is adherent and the upper part separates, bleeding is not likely to be so great, as the upper part of the uterus will retract and close the sinuses.

Succenturiate Placenta.—In this condition, there are one or more small lobules of placenta, in the chorion, quite separate from the main mass. They are not likely to be a cause of delay, but they may be a very serious complication, if they are left behind, as secondary post-partum hæmorrhage is almost sure to arise during the puerperium, and there is great risk of sepsis. They may very easily be left behind, for the chorion is disposed to tear away and the amnion to strip off them.

Unless a very careful examination of the membranes is made at the time of delivery, you may not detect that a portion of the chorion is wanting, as the presence of the complete amnion may lead you to suppose that everything has come away. Fortunately, the condition is a rare one, but this fact does not exonerate you from the duty of carefully examining the membranes, in every case of delivery for which you are responsible.

Adherent Membranes.—When the placenta is adherent, the probability is that the membranes will also be adherent, but the membranes may be adherent when the placenta is not. Retention of the membranes, or a portion of them, is very often the result of improper conducting of the third stage of labour. If the whole of the membranes, or the greater part of them, is retained, there is no excuse for the non-recognition of the condition, but there is some excuse, if only a part is retained. As a rule, both amnion and chorion are retained, entirely or in part, but occasionally the amnion comes away completely, leaving the whole chorion behind, and you may be misled by this, if you do not examine the sac carefully, to see that both layers of the membranes have come away. The retention of a small portion of the membranes may not be serious, but it is never safe to trust to the natural expulsion of even a small portion during the puerperium. It is much safer to remove the retained portion at the time of delivery, provided you do so with proper precautions.

Treatment of delayed Third Stage.—When inertia is the cause, the uterus should be actively massaged, to cause it to contract and retract. Ergot should not be given, as it may cause hour-glass contraction of the uterus. So long as there is no bleeding, further interference is not necessary, but if there is bleeding, the

uterus should be very firmly compressed, and pressure applied downwards and backwards. This is what is known as Crédé's, or the Dublin method of expulsion of the placenta. If there are no adhesions, the placenta and membranes will be expelled. Compression of the uterus should be kept up for some time, until firm retraction has taken place. If the bleeding continues, a hypodermic injection of ergotin and a hot intra-uterine douche should be given. If firm compression fails to expel the placenta and bleeding is going on, the aseptic hand should be introduced into the uterus to separate and remove the placenta. The further treatment will be the same as for adherent placenta.

In many cases of retention of the placenta, it is really lying in the top of the vagina, and it can be expelled by pressure upon the uterus, or it may be withdrawn by hooking a finger through its lower edge.

Treatment of Adherent Placenta.—If the adhesions are firm, Crédé's method will fail. The aseptic hand must be passed into the uterus, and the placenta peeled off, by inserting the edge of the hand between it and the wall. Always separate it before attempting to remove it, as you might invert the uterus, if a portion of the placenta were firmly adherent to the fundus. Massage the uterus actively and compress it firmly as you withdraw the placenta and membranes, so as to ensure retraction and stop the bleeding. When the adhesions are very firm, you may have to scrape the placenta away bit by bit, and small portions may easily be left behind, and the uterine wall injured. Give a copious intra-uterine douche, as soon as the placenta and membranes are cleared out, and also a hypodermic injection of ergotine combined with strychnine. The placenta may be removed manually without the use of an anæsthetic, but this causes great pain and con-

siderable shock, so an anæsthetic should always be used.

In every case in which the placenta is not complete, or in which a lobule of a succenturiate placenta has been left behind, you should explore the uterus at once and remove the retained portion. Under no consideration should even a small portion of placenta be left in the uterus.

Treatment of Adherent Membranes.—In every case where you are quite sure a portion of the membranes has been retained, you should explore the uterus at once and clear it out. If you take proper aseptic precautions, and give an intra-uterine douche immediately afterwards, the risk of exploring the uterus may be disregarded. If a piece of placenta or of the membranes is left behind, these dead tissues are almost sure to become septic, and a source of great danger to the patient.

Treatment of Hour-Glass Contraction of the Uterus.—Put the patient deeply under an anæsthetic; then pass the aseptic hand into the uterus and dilate the constriction. If the placenta is not separated, peel it off and remove it at once; then give an intra-uterine douche.

Hæmorrhage in the Third Stage.—There is always some hæmorrhage in the third stage of labour, and in the great majority of cases it is of no consequence, but when the amount of blood lost passes a certain limit, the condition becomes a serious one. So long as the patient's pulse is not quickened in rate and lessened in volume, there is no danger. What would be a serious loss of blood to one woman, to another might not signify, so each case must be judged by itself. Under post-partum hæmorrhage this subject is fully dealt with, so it is not necessary to treat of it here.

Inversion of the Uterus.—Inversion of the uterus is a rare accident, but a very dangerous one. It generally occurs during the third stage of labour, but it may occur in the puerperium.

Causes.—Traction upon the cord is generally supposed to be the chief cause, and it probably is so, in the hands of incompetent attendants. In spontaneous cases there is probably, at first, complete inertia of the uterus, and the placenta remains attached, and from its weight, especially, if it is attached to the fundus, it drags down the uterine wall. Now, when contractions begin, if the inverted part is caught, the process will be continued until the inversion is complete. The inverted body may remain in the vagina, but the vagina often becomes inverted too, and then the whole mass protrudes from the vulva, and lies between the woman's thighs. Inversion may also be caused by injudicious pressure upon a portion of the fundus in a case of inertia. In this way a portion is pushed in, and when the contractions come on the inversion is completed. During the puerperium, it is occasionally caused by severe straining at stool.

Symptoms.—The uterus is quiescent for a time, and then severe expulsive pains come on. The patient feels that something is coming away from her, and there will be indications of severe shock and hæmorrhage, but the bleeding may not be severe.

Diagnosis.—Abdominal palpation will reveal that the uterine body is absent, and if the abdominal wall is at all lax, the fingers can be pressed into a cup-like structure in the pelvis. This is the inverted uterus as felt from above. A vaginal examination will at once reveal a rounded mass in the cervical canal or vagina. The distance it has come down will depend upon the amount of inversion which has occurred. If the in-

version is complete, and the vagina is also inverted, a large tumour will be lying between the woman's thighs. The placenta, if not previously expelled, will be attached to the mass. Care must be taken not to mistake the mass for a fibroid polypus. Such a mistake has been made. If the protruding mass is a polypus, you should be able to feel the uterine body in the abdomen, and to pass a sound into the cavity of the uterus by the side of the mass.

Prognosis.—It is a very grave condition. The great immediate risk is from shock. The risk from hæmorrhage is not so great, but it is not to be disregarded. If the inversion is not quickly relieved, the patient may die from exhaustion, from repeated hæmorrhage, or from sepsis; but, if prompt and proper treatment is adopted, the patient should stand a very good chance of recovery. The greatest risk seems to be from the shock. I have known a patient die within half an hour of shock, although the hæmorrhage was trifling in amount.

Treatment.—Reduction should be attempted at once, and in the majority of cases, if the attempt is made within a few hours, success will follow. Immediate reduction is a comparatively easy matter, but, if forty-eight hours have elapsed, the chances are that you will not succeed, and it is then probably better to wait until involution has occurred, unless sepsis has set in, when the uterus should be removed.

If the uterus is protruding from the vulva, remove the placenta, if it is still attached, thoroughly cleanse the mass with a warm antiseptic solution, and compress it, to stop the bleeding and lessen the bulk. If the operation is done immediately, an anæsthetic may not be necessary; but, if a few hours have elapsed, it should be administered. Even in recent cases, it is

preferable to give an anæsthetic, as it lessens the shock. Taxis should be applied with the hand. In recent cases, central taxis, as first described by McClintock, is most frequently used. The closed fist is steadily pushed against the fundus, until reinversion is brought about, and the closed hand is kept inside the uterus until retraction has taken place. Another method is to grasp the uterus in the hand and compress it, and push it upwards and forwards in the pelvic axis, first returning the part which has come down last, and finally the fundus. Whichever method is adopted, care must be taken to press in the axis of the pelvis. If this is not done, the uterus may simply be driven against the promontory of the sacrum, and this will prevent reinversion. If some hours have elapsed, manual taxis will probably fail. In such a case, you should try a very firm vaginal tampon, or a large Champetier de Ribes' bag. Pinard maintains that the best method of all is to use Champetier de Ribes' bag. The pressure of the bag gradually reinverts the organ.

When the reinversion has been accomplished, an antiseptic intra-uterine douche should be given. To combat shock, the patient should be freely stimulated with hypodermic injections of strychnine and a large saline infusion. These injections may be given during the operation.

The after treatment of the patient should be on the usual lines where there has been shock and the risk of sepsis.

In late cases, where the circulation has been interfered with, gangrene of the uterus occurs, and in such cases, and in those which are very septic, the proper treatment to be adopted is extirpation of the uterus by the vaginal route. The chances of success are not very great, but it is the only hope of saving the woman's life, and it must be undertaken.

In cases where taxis fails and there is no sepsis, you should wait until involution has occurred. If taxis fails, then you should open the abdomen, and dilate the ring, and reinvert the uterus, or, if you cannot dilate the ring sufficiently, you can incise it and the posterior uterine wall longitudinally, and then stitch it after reposition has been effected. If reposition is found to be impossible, hysterectomy should be performed.

Displacements of the Uterus—Prolapse of the Uterus.

—This is liable to occur, if the patient rises too soon before involution is sufficiently advanced. The ligaments of the uterus have not had time to return to their normal state, and the weight of the organ causes it to sink. This is specially likely to occur, if the perineum has been badly torn and not properly repaired. In some cases, however, prolapse occurs when the perineum has not been torn, but the pelvic fascia has been injured.

Treatment.—Keep the patient in bed until involution is well advanced, and put in a ring pessary before she is allowed to get up.

Retro-displacements.—In the early stage of prolapse, the fundus of the uterus is more or less displaced backwards, but posterior displacement may occur without prolapse. Abdominal pads under the binder are said to cause posterior displacement, but as they are only used in the first day or two of the puerperium, when the uterus is still above the promontory, it is very difficult to see how they can possibly have this effect. A more likely cause is over-distention of the bladder, but the chief factor is the relaxed condition of the ligaments, especially the round ligaments. After an attack of para- or peri-metritis, contraction of adhesions may draw the fundus back.

Treatment.—Replace the uterus, and keep it in

position by means of a suitable pessary. An Albert Smith or ordinary Hodge pessary is generally the most suitable one to use. If an inflammatory condition is present, it must first be dealt with by tampons and hot douches.

If the patient has suffered from a displacement previous to or during the early part of the pregnancy, a pessary should be inserted as soon as the uterus has involuted into the pelvis, to prevent it falling back.

CHAPTER XII.

COMPLEX OR COMPLICATED LABOURS — UNAVOIDABLE HÆMORRHAGE.

IN this form of labour there is danger to the mother and child, apart from that due to the presentation. The complication may be either maternal or foetal. The maternal complications may be from hæmorrhage, cardiac disease, chest disease, the retraction ring, eclampsia, malformations of the uterus, and rupture of the vagina and uterus. Delay from the retraction ring has already been dealt with in chapter x. The foetal complications may be from prolapse of the cord, multiple pregnancies, and abnormalities on the part of the foetus.

MATERNAL COMPLICATIONS.

Ante-partum Hæmorrhages.—We have two forms of ante-partum hæmorrhage—**Unavoidable** and **Accidental**. In both forms the bleeding is caused by separation of the placenta, the only difference being in the situation of the placenta. In the unavoidable form, the placental site is partially or entirely in the lower uterine segment, below the retraction ring; while in the accidental form, the site is in the cavity of the uterus, above the retraction ring. In both cases, the blood comes from the placental sinuses, the only difference being in the situation of the sinuses. A little blood also comes from the torn placenta in both cases, but this is of no consequence as regards the mother. When the placenta is attached,

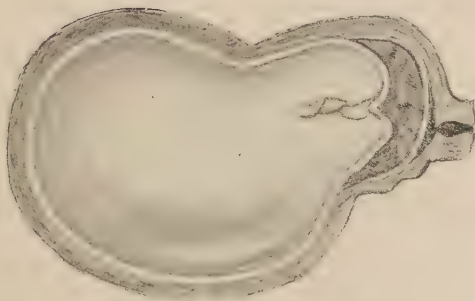
partially or entirely, in the lower uterine area or segment, the condition is known as **Placenta Prævia**. As this is the part of the uterus which stretches during labour, and as the placenta cannot stretch to the same extent as its site, separation of the placenta must necessarily occur, and bleeding must follow; hence the name unavoidable hæmorrhage. Placenta prævia is often spoken of as a form of ante-partum hæmorrhage, but this is a mistake. The separation of the prævial placenta gives rise to the hæmorrhage, and the true designation of the hæmorrhage is unavoidable hæmorrhage.

Definition of Placenta Prævia.—Placenta prævia is defined as the implantation of the placenta, in whole or in part, in the lower uterine area or segment—that is, in the part of the uterine cavity which lies below the retraction ring, or the part which stretches during labour. This part lies between the os internum and about 3 inches above it, and is characterized by: (1) its thinness; (2) the longitudinal arrangement of the muscle fibres; (3) the loose attachment of the peritoneum; (4) the presence of a circular vein at its upper limit. The placenta is never attached to any part of the cervical canal, but it may be entirely over the os internum.

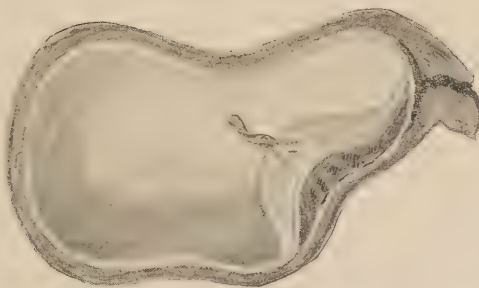
Average of Occurrence.—It occurs about once in 300 labours, and is much more frequent in multiparous than in primiparous cases. In primiparous cases, the women are usually elderly, but I have seen several cases under the age of twenty. It is said to be exceedingly rare in twin pregnancies, but in my experience the average is much the same as with single pregnancies.

Causes of Placenta Prævia.—It usually arises from a low implantation of the ovum, but in some cases it is due to the placenta developing over part of the decidua reflexa. Webster has published drawings of a case

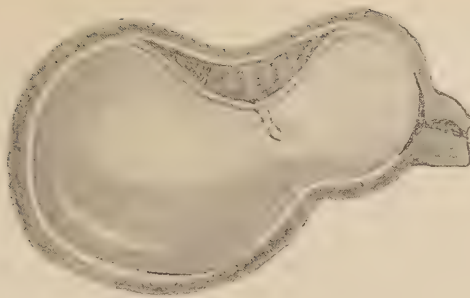
PLACENTA PRÆVIA



CENTRAL



LATERAL



MARGINAL

FIG. 54.—Modified from Dickinson.

which shows this. In many cases, there has been antecedent uterine disease in the form of endo-metritis. In such cases, the uterine cavity is enlarged, and this allows the ovum to slip down into the lower part, before it becomes embedded.

Varieties.—There are three varieties, according to the situation of the placenta, viz. (1) **complete** or **central**, when the placenta completely covers the os internum (Fig. 54); (2) **lateral**, when the os is approached or partially covered by the placenta; (3) **marginal**, when only the margin of the placenta extends below the retraction ring. This latter variety is probably more common than is generally supposed, but there is very little danger attached to it. When slight hæmorrhage occurs during labour, as it not infrequently does, it probably arises from the separation of a small portion of placenta which has been attached below the retraction ring.

Time of Occurrence of the Hæmorrhage.—It most frequently occurs during the seventh month, but it is usually spoken of as occurring from the sixth month onwards. When hæmorrhage occurs earlier than the sixth month, the case is usually considered as an abortion or miscarriage, but some of these cases are really ones of placenta prævia. As a rule, the patients do not go to full time, because, as I have already stated, the lower uterine segment becomes stretched long before actual labour sets in; and besides, from its abnormal situation, the placenta is likely to be accidentally separated by any extra strain to which the woman may be exposed. As we shall see, when dealing with accidental hæmorrhage, the separation of a normally situated placenta is usually, if not always, due to an extra strain upon the abdominal contents, and it is quite evident, that if the placenta should happen to be attached low

down, an extra strain would be much more liable to cause separation than when the placenta is in the usual situation.

Source of the Hæmorrhage.—The main source is from the utero-placental sinuses, which are torn across, but a little comes from the placenta, when a cotyledon is partially torn, and some from Meckel's sinus. The bleeding from the placenta is of no consequence as regards the mother, for any blood lost from the placenta can only be foetal. If there should be much bleeding from the placenta, it would cause the death of the foetus ; but the real risk to the foetus is not from loss of blood through the placenta, but from separation of the placenta, and interference with the purification of the foetal blood.

The usual cause of the separation of the placenta is the increase in area of the lower uterine segment, but in some cases bleeding occurs before there is any dilatation, from a strain causing accidental separation. The low situation of the placenta predisposes to this. In full dilatation, the lower uterine area is increased over two and a half times, but a much less increase is sufficient to cause detachment. The placenta cannot expand to the same extent as its site, so the attachment must be torn through.

Signs and Symptoms.—The first indication is a sudden onset of hæmorrhage without any apparent cause, between the sixth month of pregnancy and full time. It frequently occurs when the patient is in bed. The first attack may be slight, ceasing in a little while, to recur some hours, or days, or even weeks later. On the other hand, it will be very severe and persistent, if there has been much separation of the placenta. At first, as a rule, no pain will be felt, but after a time contractions will set in. It has been stated that the

hæmorrhage occurs during the pains, as the placental attachment is then being torn through and the sinuses opened into. As a matter of fact, the contractions of the uterus tend to lessen the blood supply for the time being by compressing the arteries, and in the lateral and marginal varieties, by driving the presenting part down, they compress the placenta and stop the hæmorrhage, just as a plug does. During a contraction, the blood which has already escaped into the cervix and upper part of the vagina will be forced out, and when the pain passes off, there will be another gush. The same thing happens in external accidental hæmorrhage, so that it is impossible to diagnose between the two conditions on this score.

If the hæmorrhage is great, the patient will show signs and symptoms of collapse, viz. pallor, weak and rapid pulse, restlessness, ringing in the ears, faintness, etc.

Diagnosis.—Palpation of the abdomen will not reveal the position of the placenta, unless it should happen to be attached anteriorly, but very little dependence can be put upon this method of diagnosis. You must depend upon the vaginal examination, and even this may not reveal very much at first, unless the os is sufficiently dilated to admit a finger. When the os is completely closed, you will be able to make out a thickened, boggy feeling in the fornices. In most cases, the os will be sufficiently open to admit a finger, and if the placenta is centrally placed, you will feel it easily; if it is laterally placed, you will feel the bag of membranes and the edge of the placenta; while, if it is a marginal variety, you can only reach the edge of the placenta by passing your finger well in and sweeping it round. The membranes are always rougher near the placenta than further out, so that if you find this rough con-

dition, you may be quite sure that the edge of the placenta is very near. The placental tissue feels very like a sodden sponge, and it can be told from blood-clot by the fact that the latter is smooth and can be broken down by the finger.

In diagnosing between accidental and unavoidable hæmorrhage, the history of the onset will not help you much. If you can reach the placenta, you know that the case is one of unavoidable hæmorrhage, but if not, you may not be able to distinguish between the two, until the os is dilated sufficiently to allow of a thorough examination. This is not of much consequence, as the treatment of the two conditions is much the same. Cancer of the cervix may give rise to profuse hæmorrhage near full time, and I have known this condition to be mistaken for placenta prævia ; but there should be no difficulty in distinguishing a fungating cervix from placental tissue. The only other form of hæmorrhage in which a mistake may be made is where there has been an injury to the vagina, but on examination the vaginal lesion should be easily recognized.

Prognosis.—It is a dangerous condition, especially for the child. If the case is seen early and proper treatment is adopted, the maternal mortality should not be higher than 5 per cent. The prognosis for the child is extremely grave. About 60 per cent of the children are usually lost at the time of delivery, while some of those born alive are too premature to live any length of time. The method of treatment, which is safest for the mother, is not the best for the child, and as, at the best, the child is likely to be weakly, the mother should not be exposed to any risks in the hopes of saving it.

The central variety is the most dangerous to both mother and child, the lateral less dangerous to both,

and the marginal least dangerous. With the marginal variety the danger is very slight.

During the puerperium sepsis is more liable to arise than after an ordinary case, but with proper precautions this risk is not great.

Treatment.—When the hæmorrhage is slight, palliative treatment should be tried, more especially if the child has not reached a viable age. You may be able to tide the patient over for a time, until the child has sufficiently developed to be viable. Should the hæmorrhage recur, active treatment should be adopted.

Palliative treatment consists in keeping the patient at absolute rest in bed, under an opiate, if necessary. The bowels should be gently moved, and a low diet given. Hæmostatic drugs are absolutely useless. In hospital, one can treat a patient in this way without risk, as she is continually under observation, and if the hæmorrhage recurs, measures can be taken at once ; but with private patients there is considerable risk, unless the patient is within easy reach, and you can get the friends to understand that, if hæmorrhage recurs, you must be called immediately. If the patient is far from assistance, palliative treatment should not be adopted.

If the bleeding has recurred, or if the first attack is a severe one, active measures must be adopted. What you wish to accomplish is : (1) to control the hæmorrhage ; (2) to dilate the cervix ; (3) to deliver the child ; (4) to prevent post-partum hæmorrhage. Let us first consider a case where the cervix is closed, or only very slightly dilated. The best thing to do then is to plug the vagina firmly, pushing a little of the gauze into the cervix, if it will admit it. Aseptic precautions must be used, and the plugging must be done very thoroughly, or the treatment will fail. The pressure exerted by the

plug stops the bleeding, while at the same time uterine contractions are set up and dilatation of the cervix caused. If the plug is properly inserted, the bleeding will be controlled; but if only one or two pledgets of wool or gauze are used, it will be useless. The best material to use for plugging is an antiseptic gauze, such as iodoform gauze, but aseptic lint or an aseptic kite-tailed plug of wool may be used. If an antiseptic plug is used, it may be left in for as long as twenty-four hours, but, as a rule, uterine contractions will have been set up long before that, and dilatation of the cervix caused. An aseptic plug should not be left in more than eight or ten hours. When the plug is removed, the cervix will generally be found sufficiently dilated to allow of delivery, but if this should not be the case, another plug may be inserted. More than two plugs should not be used, as the pressure upon the mucous membrane of the vagina might have an injurious effect upon it. If, when the plug is removed, the os is dilated sufficiently to admit two fingers, bipolar version should be done, if it is a vertex or transverse presentation, and a leg be brought down. When a leg is once got down, and the breech is drawn into the cervical canal, it acts as the best possible plug and dilator. The hæmorrhage is now completely controlled by pressure, and all that is necessary is to wait, until uterine action expels the breech. Massaging the uterus through the abdominal wall will assist this. The bringing down of the leg partially empties the uterus, and allows of retraction taking place, so that the uterine arteries are compressed and the blood supply lessened. When the body is expelled, beware of delivering the after-coming head too quickly. If the cervix grasps the neck, wait. The child will probably be sacrificed by waiting, but at the best its chances are small, so no risk to the

mother should be run for the sake of a weakly, premature child. If you drag the head through, you may save the child, but if you tear the cervix, you will probably lose the mother from uncontrollable post-partum hæmorrhage. It is a triumph of obstetrics to be able to save both mother and child, but if only one life can be saved, it certainly should be the mother's. As soon as the child is born, the uterus should be firmly kneaded, and if the placenta is not expelled, and bleeding is going on, introduce your hand and remove it. A hypodermic injection of ergotin should be given at once. A hot douche is usually given, but its action in these cases is not so beneficial as in ordinary post-partum hæmorrhage. The placental sinuses are in the lower uterine segment, which at first lies more or less open in the top of the vagina, until it and the cervix regain tone and retract, and the stream of fluid may very easily wash the clots out of the mouths of the vessels. If supra-renal extract is added to the douche, the styptic action will lessen this risk. If there is post-partum hæmorrhage, the quickest way to check it is to introduce your hand into the vagina and grasp the two lips of the cervix, while with your external hand you jam the body of the uterus down, and compress it firmly between the two hands. The cervix, which is grasped in the internal hand, is invaginated, as it were, into the lower uterine segment, and direct pressure is brought to bear on the open sinuses. The pressure can be kept up for some time, until clotting occurs in the mouths of the vessels. If the cervix is torn, the bleeding can be controlled for the time being in this way, but stitches should be inserted. In cases where there has been post-partum hæmorrhage, the uterus and vagina should be firmly plugged, after the bleeding has been controlled in the way just described. The uterine cavity should

first be plugged, then the cervix, very firmly, and finally the vagina. When the cervix is torn, and you have not the means at hand for stitching, firm plugging should be resorted to. The plug can be left in for twenty-four hours. The after-treatment of the patient is the same as after post-partum hæmorrhage.

We shall next consider a case where the os is sufficiently dilated to admit two fingers. Here, again, the vaginal plug may be used, or Champetier de Ribes' bag. This latter method is most useful. When *in situ*, the bag completely controls the bleeding, and it acts as a most efficient dilator. By the time that the bag is expelled, the os is so fully dilated that you can deliver at once by podalic version. Barnes' bags may be used, but they are not nearly so efficient. Bossi's dilator is sometimes used, but there is great risk of tearing the cervix, unless extreme precautions are used. Another method of dilatation, which is probably the most used of all, especially when the os is about the size of half a crown or larger, is the manual method, which is fully described on page 275. When the dilatation is sufficient to allow the hand to pass, podalic version is done and delivery effected slowly.

In cases where the cervix is fully dilated and the head presents, delivery should be effected at once. You may use forceps instead of version, but version is preferable.

I have not dealt with the treatment of each variety, as the same treatment may be used for all. The only difference in the treatment of the central variety is, that in doing bipolar version the foot must be brought through the placenta, and in doing podalic version you must pass your hand through the centre of the placenta, if it cannot be got round the edge of it.

Sir James Y. Simpson advocated stripping off the pla-

centa completely, and Barnes advocated stripping off the prævial portion. This tends to favour dilatation and check the bleeding, but it lessens the child's chance. It is useful in some cases.

Rupturing the membranes has been advocated, but this should only be done in the marginal variety. If the liquor amnii is allowed to drain away in the central or lateral varieties, bipolar version will be rendered impossible, and podalic version very difficult.

If the patient is very much collapsed, give her a saline injection before or after delivery, and stimulate her freely. Always be prepared to deal with post-partum hæmorrhage.

Ordinary, and also vaginal Cæsarean section has been advocated as the safest method of treating placenta prævia. More children will be saved in this way, but this is the only advantage that can be claimed. I have done the ordinary Cæsarean section in a case of placenta prævia with twins, and saved the mother and the children; but the operation was not done for the placenta prævia, but because the woman had a badly contracted pelvis, and she had had Cæsarean section performed on her before. I have no hesitation in condemning the operation, unless there is some complication calling for it, other than the situation of the placenta.

CHAPTER XIII.

ACCIDENTAL HÆMORRHAGE.

THIS hæmorrhage arises from the separation of a normally situated placenta, *i.e.* a placenta situated in the uterine cavity anywhere above the retraction ring. I believe the most usual situation of the placenta to be on the anterior wall of the uterus, as in the great majority of my Cæsarean sections I have found it there ; but it may be attached in any part of the uterine cavity. The bleeding comes from the opened-up sinuses, just as it does in unavoidable hæmorrhage, the only difference being that the sinuses are above the retraction ring, while in unavoidable hæmorrhage they are below the ring. A small amount of blood comes from the torn placenta, but it is of no consequence, so far as the mother is concerned.

Varieties of Accidental Hæmorrhage.—There are two varieties — **external** or **apparent**, and **internal** or **concealed**. In every case of the **external** variety there is more or less clot in the uterus ; while in many cases of the **concealed** form there is also some blood lost externally.

Accidental hæmorrhage is more frequent in multiparæ than in primiparæ, just as unavoidable hæmorrhage is. It only differs from an abortion in that it occurs in the later months of pregnancy, and is much more dangerous. It occurs in the same class of cases, and from much the same causes, as an abortion.

Time of Occurrence.—Like unavoidable hæmorrhage, it occurs from the sixth month onwards to full time. Hæmorrhage occurring earlier than the sixth month is usually spoken of as due to an abortion or miscarriage, but there is no difference between the two, especially after the placenta has formed. They are exactly the same, only hæmorrhage in the early months is not so dangerous as it is in the later.

Ætiology.—The causes are much the same as in abortions. In the majority of cases the placenta is degenerated, and it will generally be found that endometritis was present before impregnation. A perfectly normal placenta may become separated as the result of a severe accident, but this is exceptional. The exciting cause may be direct violence, such as a kick or blow on the abdomen, over-exertion, over-stretching, such as is caused by reaching for something above the head, or in hanging up clothes, shock, fright, severe vomiting, severe coughing, and severe straining at stool. In some cases, there may be no apparent exciting cause.

Signs and Symptoms.—These differ in the two forms. In both cases, for some reason or other, a portion of the placenta has become detached, and a certain amount of blood is poured out between the placenta and the uterine wall. In the external form, it quickly makes its way down between the membranes and the uterine wall, and is discharged through the vagina. In the internal form it clots, and none of it may find its way out. Adhesion of the membranes in the lower pole of the uterus is probably the cause of the retention of the blood. If the amount is small, and the clot gets spread out between the membranes and the uterine wall, it may remain there and become organized and cause no further trouble. In such a case, when delivery occurs at full time, a portion of the membranes will be found

to be covered with a layer of light reddish substance, about a quarter of an inch in thickness. It is somewhat like reddish plasticine which is used by children for modelling purposes. The clot, when it is of any size, acts as a foreign body, and sets up uterine contractions, and more separation occurs, and, of course, more bleeding. In the concealed form, the blood is retained in the uterus, and little or none of it may come away through the vagina, but usually there will be a free flow of serum. In the external form, after delivery more or less clot will be found in the uterus, but the greater part of the blood escapes externally. The blood may burst through the membranes and mingle with the liquor amnii, but this very rarely happens. In the concealed form, the uterus becomes very much distended, more oval in form, and you may be able to feel boggy masses in it, indicating where clots are lying. If there is much hæmorrhage, you will not be able to feel the fœtal parts. The woman will show signs of collapse, and she will complain of a continuous rending pain, as if her uterus were going to burst. If she is a multiparæ, she will tell you that the pain is different from what she had felt in her former labours. It is continuous, and, if there are any contractions, will be worse at times, but she will not feel much relief in the intervals. This is an indication of the utmost importance.

You may get a history of an accident, or of some violent exertion, but in many cases, the women will not be able to give any cause for the bleeding. The bleeding often becomes apparent during the night when the patient is in bed ; but the separation of the placenta has probably begun some hours before, as some time usually elapses before the blood makes its way out. In the same way, in the concealed form, the patient

may not begin to feel much discomfort until some time after the separation has commenced. In the concealed form, uterine contractions are usually absent, but the uterus is in a rigid condition from over-distention. In the external form, at first there are no contractions, but they come on after a little, and the stronger they are, the less risk there is for the patient.

Diagnosis.—In the external form there will be bleeding from the vagina. The patient may or may not be having uterine contractions, if it is before full time, but they will soon come on. If the hæmorrhage is profuse, the pulse will become rapid and weak, and signs and symptoms of collapse supervene. If the amount of collapse is greater than you would expect from the apparent loss of blood, there will be concealed hæmorrhage as well, making it much more dangerous. On palpating the abdomen, you should be able to make out the foetal parts, and if there is clot in the uterus towards the front, you may be able to feel it as a boggy mass. If you can hear the foetal heart, you know that the placenta is not as yet completely separated. On making a vaginal examination, you will usually find the os sufficiently dilated to admit one or more fingers. The cervical canal will be full of clot, which may be mistaken for placenta, but it is smooth, and can be easily broken down with the fingers. If you can pass your finger in, and you do not reach placenta, you know the case is one of accidental, and not of unavoidable hæmorrhage. If the os is completely closed, you will not be able to decide which form of hæmorrhage it is, but this is not of very much consequence, as the treatment of the two conditions is much the same.

In the concealed form, there may be some external bleeding, but often there is only a copious serous discharge, and even that may be absent. The patient will

be in a state of collapse, and she will complain of a continuous bursting pain in the uterus. The pulse will be very feeble, or even absent at the wrist, and the lips will be bloodless. On palpating the abdomen, you will find the uterus is oval in shape, much distended, and very tense. You will not be able to feel the foetal parts, but you may make out irregular boggy masses in the uterus, indicating where the clots are lying. No foetal heart will be heard. The vaginal examination will not reveal much. If the os is dilated sufficiently to admit a finger, you will not reach the placenta, and you will find that the bag of membranes is very tense from the increased intra-uterine pressure.

The only other condition which can give rise to such sudden and profound collapse is rupture of an internal organ, such as the stomach, liver, bowel, bladder, uterus, or of an extra-uterine gestation. In rupture of any of the organs except the uterus, you would have the history to guide you, and, in palpating the uterus, you would find it normal in shape and size, and you would be able to feel the foetal parts, and the foetal heart would probably be audible. Rupture of the uterus occurs nearly always in the second stage of labour, while accidental hæmorrhage usually begins before labour has set in. In a partial rupture, the signs and symptoms are almost identical, but it occurs almost always in the second stage of labour. In a complete rupture, palpation of the abdomen will reveal that the foetal parts are extremely easily felt, and in many cases, you will be able to make out the body of the uterus separate from the foetus. On making a vaginal examination, you will find that the presenting part has receded from the brim, and by passing your fingers in, you will feel the rent in the uterus. In rupture of an extra-uterine gestation near full time, the history will probably

be of some assistance. The foetus will be very easily felt in the abdomen, and, in fact, the indications will be much the same as with a ruptured uterus.

Prognosis.—In the external form, the risk for both mother and child are much the same as with unavoidable hæmorrhage, or perhaps a little greater. In the concealed form, the prognosis is exceedingly grave, as, unfortunately, the condition is often not recognized until the patient is utterly collapsed. When the placenta is completely separated, the child must necessarily perish. Its chances may be said to depend upon the amount of separation of the placenta, and also the ease of delivery.

In either form, the woman may die before delivery, or she may die from shock or post-partum hæmorrhage immediately after delivery. There is also greater risk of sepsis, phlegmasia alba dolens, and embolism in these cases.

Treatment.—We shall first consider the external variety. If the bleeding is small in amount, and the uterus is quiescent, the same treatment should be tried as for a threatened abortion, viz. absolute rest in bed on a low diet. An opiate may be given. The bleeding may cease, and the case go on to full time, but such a happy result is rarely obtained. If the bleeding continues, or if it recurs after ceasing for a time, then steps must be taken to get the uterus emptied. In many cases, the best thing to do is to rupture the membranes, if uterine contractions are occurring, and put on a very firm binder, but the case must be watched carefully, for fear of concealed bleeding. The case now may be left to nature, and if it is found necessary delivery may be assisted, when the cervix is fully dilated. In severe cases, more active treatment will be necessary. Firm plugging of the vagina is strongly advocated by some,

and if contractions are going on it is a useful method ; but, if there are no contractions, there is considerable risk of converting an external into a concealed hæmorrhage. It is claimed that, when the blood is dammed back in the uterus, the bleeding must cease, as soon as the intra-uterine pressure becomes greater than the blood pressure. This is true, and it will happen if the uterus is contracting ; but if the uterine muscle is flabby and without tone, the bleeding will go on, until the distention becomes very great. In a healthy uterus this will not occur, but accidental hæmorrhage rarely occurs in a healthy uterus. If the plug is used, a very firm abdominal binder should be applied, and the patient's pulse must be carefully watched. The plug may stimulate contractions, and if they begin to get strong, there will be no fears of internal bleeding. Leave the plug in, until you are sure that there is sufficient dilatation to allow of delivery. When you take it out, rupture the membranes and deliver by version, or, if the head is well down, allow nature to finish the delivery, or apply forceps. In cases where severe bleeding is going on and the uterus is not contracting, steps must be taken to hasten dilatation and delivery. The cervix may be dilated by means of Champetier de Ribes' bag, (keeping up traction on the bag), by means of Bossi's dilator, or by manual dilatation. In cases of hæmorrhage, dilatation of the cervix is generally fairly easy. As soon as the os is sufficiently dilated, turn by either method and bring down a leg. Keep up active compression and kneading of the uterus, to get retraction of the partially emptied uterus. The bleeding will now be controlled, so do not hurry delivery, unless the os is fully dilated and the child is alive. If the os is not sufficiently dilated to allow of the head passing easily, beware of 'dragging it through forcibly, or you may

rupture the cervix and add a very serious risk. When the child is dead, the after-coming head may be perforated to lessen its bulk. As soon as the child is born, the uterus must be actively compressed, and, in most cases, the hand should be introduced into the cavity to clear out the clots and placenta. The uterus should be at once firmly compressed bimanually, to ensure retraction, and then a very hot douche (120° F.) should be given, and ergotin hypodermically. If these means fail to completely check the bleeding, the uterus and vagina should be firmly plugged. In severe cases, normal saline solution should be injected into a vein or into the areolar tissue, before, or immediately after delivery. After delivery, it may be given into the rectum. The patient should be freely stimulated with spirits, ether, or strychnine. The after treatment will be the same as after post-partum hæmorrhage.

Treatment of the Concealed Variety.—In midwifery work there is no more difficult problem to face than the treatment of concealed accidental hæmorrhage. The unfortunate thing is that the cases are rarely seen, until collapse has supervened. If you should see a case before the uterus is over-distended, do not wait, but treat the patient at once. Rupturing the membranes is worse than useless, as the uterus is paralysed, and it cannot contract, so the escape of the liquor amnii will only make room for more blood to be poured out. Forcible delivery must be resorted to. Dilate the cervix by means of Bossi's dilator, or manually, and turn and deliver. As the child will be dead, perforate the after-coming head, to lessen the strain upon the cervix. Turn the clot out, and knead the uterus down on the internal hand, and then plug the cavity firmly with iodoform gauze. While you are delivering, an assistant should give a saline injection of at least two pints, either into

a vein or under the breasts. Strychnine and ergotin should be freely given hypodermically, and as soon as the uterus is plugged, the lower end of the bed should be raised. Warmth should be applied to the body, and every means taken to counteract shock.

If you are called to a case where there is very marked collapse, it is very questionable if forcible delivery should be attempted. If the patient is in hospital, abdominal section and removal of the uterus will probably give her the best chance; but if she is in her own home, such an operation will be out of the question. You may deliver her forcibly, but she will be almost sure to die in your hands. By this time the bleeding will have ceased, as the uterus cannot contain any more blood, and if you can tide the patient over the next few hours she may rally, and in the meantime the uterine sinuses will become closed with clot, and when delivery takes place, the risk of post-partum hæmorrhage will be lessened. Give the patient large doses of strychnine and ergotin hypodermically, and a saline transfusion of at least two pints. If she can bear it, put on a firm binder, and raise the foot of the bed, or the lower limbs and pelvis of the patient. If the patient survives for a few hours, uterine contractions will come on, and, if necessary, you can assist delivery. As soon as the child is born, clear the clot out and plug the uterus firmly. If necessary, repeat the saline transfusion. By this method of treatment, I have saved a patient, who was pulseless at the wrists on admission.

Concealed accidental hæmorrhage is occasionally met with at the fourth or fifth month of pregnancy. There is usually a little external bleeding off and on for several weeks. The uterus feels very boggy, and the condition is extremely like that arising from a hydatid mole. On dilating the cervix sufficiently to admit a finger, you

will find a large quantity of black clot in the lower part of the uterine cavity, and the ovum will be felt attached high up.

Treatment.—Wash the clot out, and then plug the cavity and cervix with iodoform gauze for twenty-four hours. When the plug is removed, the cervix will be taken up, and the os will be sufficiently dilated to allow of the complete clearing out of the uterus.

It is difficult to understand why the uterus remains quiescent for weeks, with such a large amount of clot in it. One would expect such a large foreign body would set up uterine contractions in a very short time, but it does not do so. I have seen four such cases, and in every one there was evidence that the clot had been retained for several weeks.

CHAPTER XIV.

POST-PARTUM HÆMORRHAGE.

As the name implies, this form of hæmorrhage occurs after parturition is completed, and, strictly speaking, it should be limited to hæmorrhage after the placenta has been expelled. When it occurs after the child has been born, and before the birth of the placenta, it should be termed hæmorrhage in the third stage of labour, but for convenience we shall consider all excessive hæmorrhages which occur after the birth of the child as post-partum, irrespective of the birth of the placenta. When the placenta is still in the uterus, it will usually be found to be partly adherent. When it is completely adherent, there will be no bleeding from the uterine sinuses, but if the cervix has been torn, there may be profuse post-partum hæmorrhage of the traumatic variety.

Source of the Hæmorrhage.—It is usually from the uterine sinuses in the placental site, but it may be from a laceration in the cervix or vagina.

Nature's method of checking hæmorrhage from the uterus, after delivery, is by retraction of the muscular fibres. The permanently shortened muscular fibres compress the vessels in the uterine wall and close up the sinuses. Clotting also occurs in the mouths of the vessels. When the uterus is well retracted, its cavity is very small, and there is great pressure upon the placental site, so bleeding cannot occur from the sinuses.

Varieties of Hæmorrhage.—There are two forms — **Atonic** and **Traumatic**. The atonic form, which is the usual one, is due to the want of retraction of the uterus, or uterine inertia, in the third stage of labour. The traumatic form is caused by a laceration, usually of the cervix, or it may be of the vagina or perineum. As a rule, vaginal or perineal lacerations do not bleed profusely, but occasionally one finds severe bleeding from a laceration in the vestibule. The plexus of veins here sometimes becomes very varicose during pregnancy, and if it is opened into during labour, the bleeding will be profuse. In the traumatic form of hæmorrhage, the uterus may be very firmly retracted, and yet the bleeding goes on. It is well to remember this, as it will enable you to diagnose traumatic hæmorrhage at once, if you find the uterus firmly retracted and hæmorrhage going on.

Causes of the Atonic Form.—As I have already said, it is caused by the want of proper retraction of the uterus, or uterine inertia. Uterine inertia may arise in the third stage of labour ; (*a*) from the exhaustion of a too prolonged labour ; (*b*) from previous over-distention by a multiple pregnancy, or hydramnios ; (*c*) from frequent pregnancies following each other ; (*d*) from a weak state from serious constitutional disease ; (*e*) from too rapid delivery. While the want of retraction is the great cause, there are other causes, and when they are present, as a rule, more or less uterine inertia is also found. These causes are :

1. A large placental site in cases of twins or triplets, and in such cases the over-distention predisposes to uterine inertia, which is the real cause of the hæmorrhage. No matter how large the placental site may be, if there is good retraction there will be no hæmorrhage.

2. Retention of clots, or pieces of placenta or membranes..

3. Partially adherent placentaë.

4. Previous hæmorrhage in cases of ante-partum hæmorrhage.

5. Disease of the uterine walls, such as fibroids, etc.

6. Hæmorrhagic diathesis, as from hæmophilia, purpura hæmorrhagica, anæmia, etc.

It will be seen that all of these conditions, except perhaps the last one, and it is very rarely met with, are just those which interfere with the proper retraction of the uterus.

Varieties of the Atonic Form.—It is usually divided into **primary** and **secondary**. The primary form occurs, either during the third stage of labour, or within a few hours of the completion of that stage, generally within the first hour. The secondary may occur, at any time later during the puerperium.

The Primary Variety.—The blood usually gushes from the vagina, but there is also a considerable amount of clot retained in the uterus, and in a very few cases, there is little or no external bleeding, but the uterus becomes distended with concealed hæmorrhage. The concealed form is very rare.

Signs and Symptoms.—The patient's pulse becomes very quick and feeble, and she complains of dizziness, singing in her ears, flashes of light before her eyes, and she may faint. In severe cases, the collapse is extreme. There will usually be a great gush of blood from the vagina, but in a few cases, the external loss is trifling. The uterus will be felt to be very flabby, and you may have difficulty in defining it through the abdominal wall. If the hæmorrhage is concealed, the uterus will be felt to be much larger than it should be. A sudden quickening of the pulse during the third stage of labour,

or shortly after it is over, almost invariably points to the occurrence of hæmorrhage.

Diagnosis.—A quickened pulse, indications of collapse, a flabby or distended uterus, and, usually, a great gush of blood, make the diagnosis easy. If you find the pulse has quickened after delivery of the child, examine your patient very carefully, and do not leave her until the uterus is well retracted.

Prognosis.—It is a dangerous condition, but prompt and proper treatment should save the great majority of the cases. The immediate risk is from the hæmorrhage, but even if it is checked, there is risk from sepsis, phlegmasia alba dolens, embolism, or the patient may die of exhaustion. If the patient suffers from air hunger, and is very restless, the outlook is extremely bad. I have only once known a patient recover after severe air hunger.

Treatment.—Prevention is always better than cure, and this is specially true in reference to post-partum hæmorrhage. In fact, if all labours were properly conducted, especially the third stage, post-partum hæmorrhage would hardly ever occur. If a patient has in former labours suffered from inertia uteri and hæmorrhage, for the last few weeks of pregnancy she should take small doses of ergot, strychnine, and iron, to tone up the uterine muscle. This will probably prevent post-partum hæmorrhage. However, the great preventive measure is to conduct the labour, so that the uterus will retract well when it is emptied. In no case should labour be allowed to drag on indefinitely, until the uterine muscle is thoroughly worn out. Timely and proper use of the forceps is one of the best preventives we have. I have already discussed delivery in a delayed second stage, so need not dwell upon it, except to insist upon the importance of delivering slowly, so as to allow the

uterus to retract as the body is withdrawn. Keep the uterus firmly pressed against the body as it is withdrawn. After the child is born, place your hand on the uterus, and keep up gentle friction, but do not compress it unless bleeding begins. Wait patiently for natural separation of the placenta, and do not express it until you feel it has slipped into the vagina. When this occurs, the body of the uterus rises somewhat in the abdomen. Forcible expression of the placenta immediately after the birth of the child, is exceedingly bad practice, and if it is done, post-partum hæmorrhage is very liable to occur, and portions of the membranes are also apt to be left behind. This is not nature's method. Time must be allowed for proper retraction to occur. After the placenta is expelled, the uterus should be grasped, until it is firmly retracted and remains so. If there is any tendency to relaxation, do not let it go, but keep kneading it until you are sure there is no risk of hæmorrhage. Where there is any tendency to relaxation, give a hypodermic injection of ergotin. Always examine the placenta and membranes carefully, and make sure that the uterus is completely emptied. If there is anything left behind, the retraction will not be complete, and hæmorrhage will be almost sure to occur sooner or later. If there is anything left behind, pass your hand in and clear it out at once, and then give an intra-uterine douche. If the patient has been under an anæsthetic during delivery, be specially careful, as such cases are very liable to bleed. It is often said that chloroform does not interfere with uterine contractions, but that is not the case, if the anæsthesia is at all deep, as it should be, in artificial delivery. If the third stage of labour is properly conducted, post-partum hæmorrhage can be largely prevented.

In cases where hæmorrhage comes on before the placenta is expelled, try at once to express it by kneading the uterus, and firmly compressing it downwards and backwards into the brim of the pelvis. If you cannot expel it in this way, do not wait, but at once introduce your aseptic hand into the uterus, and remove the placenta, membranes, and clots. Peel the placenta off by inserting the edge of your hand under it, and make sure you get it and the membranes completely away. Knead the uterus down on your closed hand retained in the cavity, or compress it firmly between one hand in the vagina and the other over the abdomen. If it has been a case of placenta prævia, grasp the two lips of the cervix in the hand in the vagina, and compress the uterus between the two hands. In this way you invaginate the cervix into the lower uterine segment, and directly press upon the bleeding sinuses which are situated in the lower uterine segment.

Compression of the aorta has been strongly advocated as the quickest and best means of controlling post-partum hæmorrhage. It is very useful, but it is not nature's method. The aorta may be compressed by pushing the closed hand against it, just about the level of the umbilicus. Another method is by a tourniquet of strong rubber tubing round the body, about the same level. I have not had any experience of this method, but it is said to be most effectual. For some time, I have used compression of the aorta combined with compression of the uterus, to ensure retraction. If the uterus is grasped through the abdominal wall by passing the fingers well down behind it, the back of the wrist can be made to compress the aorta just at its bifurcation, and in this way you control the blood supply to a large extent, and by stimulating the uterus you bring about retraction. Ergotin should be given

hypodermically, and after you have controlled the hæmorrhage for a time by compression, you should give an intra-uterine douche of a temperature of 120° F., or just as warm as you can bear your hand in with comfort. The hot douche stimulates retraction, and it will generally control the hæmorrhage efficiently. Active compression and friction of the uterus must be kept up all the time, until there is firm retraction. After an hour or so, a firm binder may be put on with pads to compress the uterus, but, if there is any tendency to relaxation, do not trust to anything except your hand, and never leave your patient until you are quite sure there is no risk of the hæmorrhage recurring.

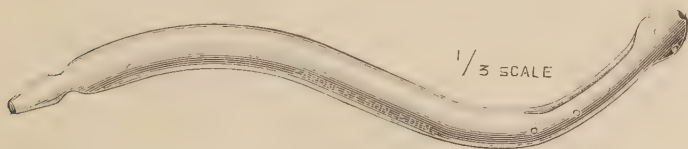


FIG. 55.—Glass nozzle for giving an intra-uterine douche.

These means are generally efficient in controlling the hæmorrhage, but if it should continue, the best thing to do is to plug the uterus and vagina firmly with an antiseptic or aseptic plug. Iodoform gauze makes the best plug, but if it is not at hand, use aseptic gauze, lint, wool, or rags. To plug properly, it will be necessary to have a speculum or retractor, a pair of forceps to pull down the cervix, and a pair of packing forceps to push the material into the uterine cavity. If you do not have packing forceps at hand, you can push the material in with your douche nozzle. Pack the cavity as firmly as possible, and in some cases you will need a large amount of material for this; then pack the vagina, and put on a firm binder. If the uterus is

properly packed, the pressure will stop the bleeding. The plug may be left in for twenty-four hours, and even longer, if it is an antiseptic one ; but, as a rule, twenty-four hours will be long enough. When it is taken out, an intra-uterine douche should be given.

Instead of the plug, styptics are sometimes used. Barnes advocated the use of iron, but it corrodes the interior of the uterus, and this dead tissue is extremely liable to become septic, therefore I do not think iron should be used. A common household article, viz. vinegar, is a very good styptic, and it may be used in the douche. There is another styptic which has come into use within recent years, viz. preparations of the suprarenal gland. I have used it frequently with good results, in the form of the suprarenal tabloids. A dozen of the tabloids are ground up and sterilized, by boiling in a small quantity of water, and this is then added to a couple of pints of sterilized water and injected into the uterus. I have also used it by steeping the gauze of a plug in it, and I believe it not only acts as a styptic, but it also stimulates retraction of the uterus.

Besides checking the hæmorrhage, it is necessary to deal with the state of collapse and shock. The patient's body must be kept very warm by means of hot-water bottles. When much blood is suddenly lost from any cause, the vessels do not have time to contract to accommodate themselves to the new condition, and the remaining blood tends to stagnate in the large dependent veins. To prevent this as much as possible, and to encourage the return of the blood to the heart and brain, the patient should lie perfectly flat, or better with her lower extremities raised ; therefore, in all cases of hæmorrhage, the head should be lowered, and, if possible, the feet should be raised by elevating the lower end of the bed. In our hospital work we always

have blocks at hand, to raise the lower end of the bed in all cases of hæmorrhage. In private work it may not always be possible to do this. Among the poor, at all events, it is often impossible to raise the foot of the bed, as the bed is often fixed in, but the head of the patient can always be lowered and the legs raised on pillows, or the legs can be bandaged. If the blood is not circulating properly, the heart becomes affected, because it has not sufficient fluid to contract on, and when the brain is not properly supplied with blood it suffers from anæmia. It is therefore of the utmost importance to stimulate the heart, to get as much blood sent to the brain as possible, and to increase the volume of fluid in the vessels.

To stimulate the heart, hypodermic injections of strychnine, ether, or brandy should be given, and hot fomentations applied over the pericardium. Strychnine is the best stimulant when given in a dose of not less than $\frac{1}{30}$ th of a grain. A rectal injection of whisky or brandy and water, two ounces of each, is very useful. It causes uterine contractions, and is thus useful in two ways. The anæmia of the brain can be relieved by lowering the patient's head and raising the foot of the bed. Bandaging the legs and arms is also useful. If the patient can retain fluids, she should be given stimulant by the mouth frequently. Warm drinks of tea, milk, beef tea, etc., are all useful. The warmth of the patient must be kept up by means of hot-water bottles, and she must be kept very still. If she becomes restless and gasps for breath, she is suffering from air hunger, and her condition is extremely critical. In such a condition, the administration of oxygen would be useful.

The best method of increasing the amount of fluid in the vessels is by the injection of normal saline solu-

tion (1 drachm of common salt to 1 pint of sterilized water at a temperature of 100° F.). The direct transfusion of blood would be better ; but it is an operation of considerable difficulty, and requires special apparatus, and also a person to supply the blood. The saline solution may be injected into the rectum, under the

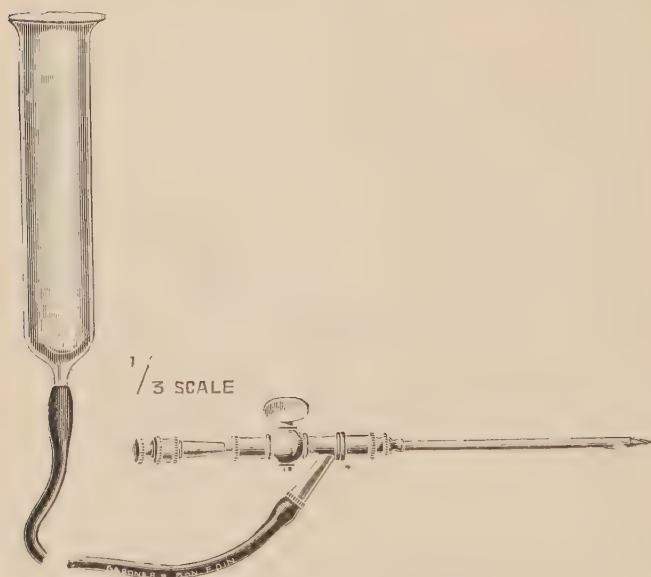


FIG. 56.—Saline Infusion Apparatus.

skin into the areolar tissue, or directly into a vein. The latter method is the most effectual, but it is not so easily done as either of the others, especially in private work. The rectal injection is the easiest, and is very useful, if the case is not very urgent. The absorption is slow, and often the rectum will not retain the fluid. About a pint should be used at the time, to be repeated in half-pint quantities every four hours.

The intercellular injection is easily and quickly done, and there is no risk from it, if aseptic precautions are used, so no one need hesitate to use it.

Method of giving an Intercellular Saline Injection.—

The apparatus consists of an aspirator trocar and cannula, or a hollow needle, several feet of small rubber tubing, and a funnel. The whole apparatus should be sterilized by boiling. The solution can be made up from ordinary common salt, but it is better to make it from soloids or aseptules, such as are supplied by many chemists. Be careful that the jug it is prepared in is aseptic. The injection can be made into any part of the body, where the tissues are lax. Under the breasts, and into the abdominal wall, are suitable places. Under the right breast is generally the most suitable. The skin where the puncture is to be made should be carefully cleansed. Expel all air from the apparatus, by running some fluid through it, before thrusting the trocar and cannula or needle into the tissues. Thrust it under the breast, and not into the breast tissue. Withdraw the trocar and raise the funnel several feet, and the fluid will begin to flow in ; but if not, move the cannula about a little to clear its point. A pint can often be injected in five minutes. If the tissues are lax, two or even three pints can be used. To save time, you may run fluid in at two different places, if you have two cannulas. A large swelling forms, and the skin becomes stretched over it. The tension causes a good deal of pain, but the absorption soon relieves this. When the cannula is withdrawn, the puncture should be sealed with collodion or a strip of adhesive plaster. The absorption is rapid, and in an hour or so the swelling will have disappeared. The fluid does not get into the vessels so quickly as when it is injected directly into a vein ; but this is not always a disadvantage, as

it is sometimes not advisable to raise the blood pressure too rapidly, for fear of starting the bleeding afresh. For instance, in a ruptured extra-uterine gestation, where the collapse is too great for immediate operation, direct transfusion into a vein might easily restart the bleeding.

If strict aseptic precautions are taken, there is no risk of an abscess forming, but if one should form, it can easily be dealt with by opening it. In many hundreds of injections, I have only once seen an abscess form, and in that case, the injection was given in a very filthy house, before the patient was transferred into the hospital.

The after-treatment of a bad case of hæmorrhage consists in giving the patient plenty of fluid and stimulating nourishment, such as milk, soups, beef extracts, etc. Alcoholic stimulants and strychnine should be given, so long as the pulse indicates their necessity. As soon as the patient's stomach will tolerate drugs, iron alone, or combined with arsenic or quinine, should be given. As these cases are very prone to become septic, the greatest care must be taken to prevent this. If the foot of the bed has been raised, it should not be kept up longer than twenty-four hours at the most, because it will interfere with the drainage of the uterus, and render the patient more liable to become septic. The patient should not be allowed to exert herself for fear of sudden heart failure, and when the bowels are moved, an enema or a gentle aperient should be used, and not a drastic purgative like salts, and the patient should not be allowed to sit up on the utensil.

Traumatic Post-Partum Hæmorrhage.—In these cases, the source of the hæmorrhage is a laceration of the cervix, vagina, perineum, or vulva. These lacerations almost invariably occur during difficult labours, where delivery is effected by artificial means, and in an in-

judicious way. Laceration of the cervix is the most dangerous, and it is nearly always the result of delivery before the cervix is fully dilated, or by the dragging through of an undiminished hydrocephalic head. As a rule, forceps should never be applied before the cervix is sufficiently dilated to allow of the head passing without risk of laceration, but in a few rare cases, where immediate delivery is called for in the interest of the mother, it may be necessary to apply the instruments before the os is fully dilated, and in such cases, the head should be brought through very slowly and with the utmost care. Delivery of the after-coming head in cases of ante-partum hæmorrhage is apt to tear the cervix, unless great care is exercised. Fig. 57 is from a drawing made from a case of placenta prævia in which this happened. You will see that the tear has extended beyond the cervix into the lower uterine segment, and that is very likely to happen. In such a case, the chances of saving the patient are very small, as the uterine artery gets torn through, and the hæmorrhage is usually fatal in a few minutes.

Lacerations of the posterior vaginal wall and perineum usually go together. Forceps are frequently blamed for this, but very extensive tears may occur in natural deliveries. The bleeding is not usually profuse, and hardly merits being called post-partum hæmorrhage.

A tear in the vestibule may cause very severe bleeding. The plexus of veins there is often varicose, and if it is opened into, the bleeding will be profuse.

Diagnosis of Traumatic Post-Partum Hæmorrhage.—

There will be profuse external bleeding with the usual signs and symptoms, although the uterus is firmly retracted. A vaginal examination will reveal a tear in the cervix, vagina, perineum, or vulva.

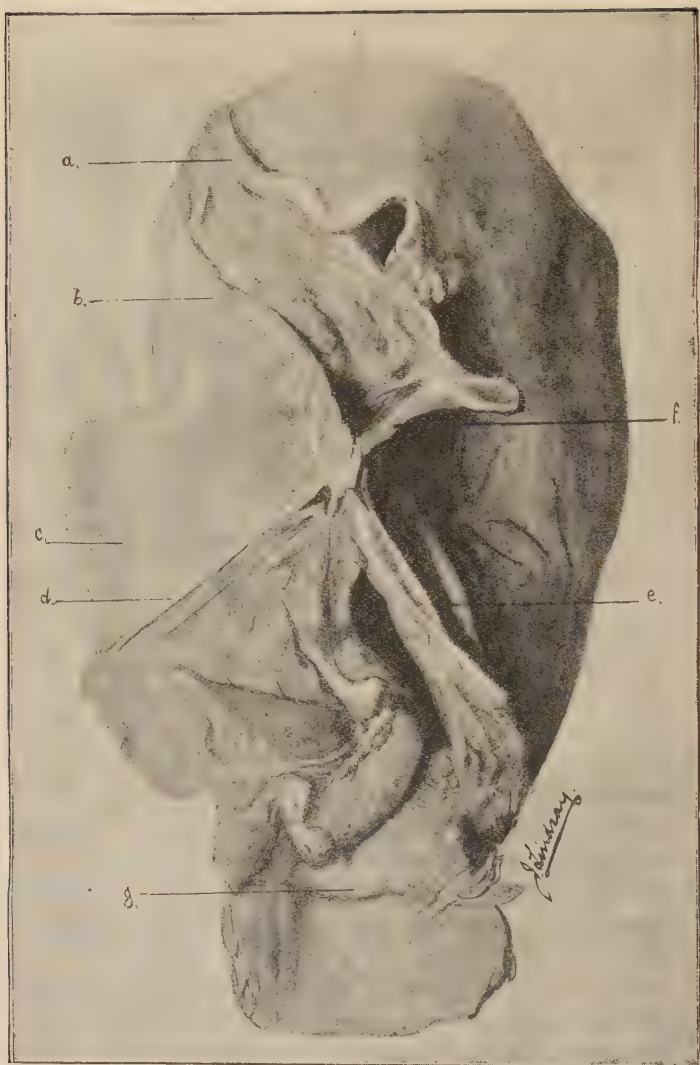


FIG. 57.—Rupture of cervix and lower uterine segment. *a*, Fallopian tube; *b*, round ligament; *c*, posterior wall of bladder; *d*, anterior layer of broad ligament; *e*, posterior layer of broad ligament; *f*, united layers of broad ligament; *g*, os externum.

Prognosis.—It is grave when the cervix is badly torn, and specially so, if it has been a case of placenta prævia, or if the tear extends beyond the cervix. There is very little risk from tears of vagina, perineum, or vulva.

Treatment.—The prophylactic treatment is to deliver slowly and with great care. In a case of placenta prævia, do not deliver until the os is sufficiently dilated to allow the head to pass easily. When the child is alive, there is always a strong temptation to hasten delivery in order to save its life, but it is better to sacrifice the child than to tear the cervix, and probably lose the mother. If the tear in the cervix is not very extensive, a hot douche will generally check it. An ordinary-sized tear will usually heal, but it is much better to stitch it. With an extensive tear and much bleeding, the hot douche will not avail, and time should not be lost with it. To check the hæmorrhage for the time being, grasp the lips of the cervix by one hand in the vagina, and firmly compress the torn side, while with the other hand over the abdomen, you jam the uterus down into the pelvis. This will control the bleeding, but is only a temporary expedient. The torn part should be stitched, and to do this properly you will require a speculum and one or, better, two pairs of volsellum forceps, large curved needles, and a needle-holder. Catgut, silkworm gut, or silk sutures may be used. Catgut, which will last for ten days, is the most convenient suture to use. With the patient in the lithotomy position, and the hips at the edge of the bed, retract the perineum and seize the cervix with forceps, and drag the uterus well down. If you have two pairs of forceps, put one on each lip. The traction upon the cervix will stop the bleeding. By pulling the cervix towards the right, if you are going to stitch the left side,

or vice versa, you will bring into view the whole side of the cervix right up to the fornix. You then pass your sutures and tie them tightly, as the parts are usually very soft. If there is a tear on the other side, treat it in the same way. If the upper suture is placed high up, there is some risk of including the ureter, and if in a few hours the patient complains of pain in the kidney, the upper suture should be taken out.

If you have not the instruments at hand to suture with, a firm plug should be inserted, but this is not so satisfactory in controlling the hæmorrhage, and it, of course, interferes with the healing of the parts.

When the tear extends beyond the cervix into the lower uterine segment, and involves the uterine artery (as in Fig. 57), stitching the vaginal portion of the cervix will not suffice. The only hope for the woman is to open the fornix and tie the uterine artery. This could only be done when there are plenty of appliances at hand, as in a hospital.

When there is no bleeding from a torn cervix, it is usual to leave the repair to nature, and no doubt, in many cases, the result is so far satisfactory that the tear closes up to a considerable extent; but a fissure is often left at one or both sides, and a secondary operation becomes necessary. If a primary repair were done at the time of delivery, just as is done in the perineum, healing would occur at once, provided the parts were aseptic and the operation was done with proper precautions. If the tear is a large one, it should be stitched at once.

If there is a tear in the vagina, stitch it after tying any bleeding points you see. A continuous catgut suture does admirably. A torn perineum, whether it is bleeding or not, should always be stitched. A tear in the vestibule must be treated in the same way. If the

tear is near the urethra, be careful not to include it in the stitch. These tears in the vestibule are sometimes troublesome to deal with, as the needle punctures bleed profusely. If this happens, a firm pad steeped in suprarenal solution should be firmly bound against the part by means of straps from the binder.

If the patient is at all collapsed, the same methods of stimulation, saline injections, etc., as are used in ordinary post-partum hæmorrhage, should be adopted.

Secondary Post-Partum Hæmorrhage.—This may occur any time during the puerperium.

Cause.—In nearly every case it is due to something retained in the uterus, such as a piece of placenta or membrane, a clot, or a small polypus. The polypus may be a small piece of placenta with organized blood-clot in it. Separation of a clot from the mouth of a sinus may cause bleeding, especially after placenta prævia. In a good many of the cases, there has been primary post-partum hæmorrhage.

The amount of blood lost at one time may not be very great, but if the bleeding recurs frequently, the drain upon the system will be serious, and pernicious anæmia may result.

The signs and symptoms are the same as those of the primary form, and it is apt to recur, if the cause is not removed.

Diagnosis.—A sudden increase of the red lochial discharge in the first few days, or a sudden return of the red discharge after it has ceased, is abnormal, and if it is of any quantity it may be looked upon as secondary post-partum hæmorrhage. Sometimes, when a patient gets up, there is a slight return of red discharge, but this is of no consequence, and should not be called secondary hæmorrhage. On palpating the abdomen, the uterus will generally be found to be larger than it

should be, and a vaginal examination will reveal that the cervix is open, and there is clot in the uterus.

Prognosis.—If the amount lost is great, the condition is grave, especially if there has been ante-partum, or primary post-partum hæmorrhage. It is also grave, if there have been repeated bleedings. There is very great risk of septic invasion when the uterus is cleared out, and from her weakened condition the patient is not in a state to fight against this complication. This is probably the most frequent cause of death in these cases.

Treatment.—The prophylactic treatment is to thoroughly empty the uterus at the time of labour, and see that it is firmly retracted before the binder is put on. If there is any tendency to relaxation, ergot should be given. When bleeding has occurred, a hot douche and ergot may check it for the time being, but, as soon as possible, the uterus should be thoroughly explored, and anything retained in it should be removed. If you cannot clear it out with your fingers, use a curette. The patient should be anæsthetized, and if a hot douche does not check the hæmorrhage, after the uterus is cleared out, plug thoroughly with iodoform gauze. Put the patient on ergot and strychnine, and, if required, give a saline injection. Do not delay in clearing out the uterus, as repeated hæmorrhages will quickly exhaust the patient. If the woman is septic, there is very great risk of further absorption taking place through the freshly opened surface. To lessen this risk as much as possible, douche out the uterus very thoroughly with an antiseptic before removing anything, then give a very copious douche after the removal and swab the cavity with tincture of iodine, and plug with iodoform gauze. In spite of every precaution, there will probably be a rise of temperature,

and perhaps a rigor, and if the temperature does not quickly fall, the outlook for the patient will be extremely bad, especially if she has lost much blood. The dangerous cases are not the foul-smelling ones, but those in which there is very little odour.

You should always safeguard yourself by telling the friends the risk there is, as otherwise they may blame you, when they find the feverishness has increased after the operation, and the patient is apparently worse than she was before.

The after-treatment is the same as after primary post-partum hæmorrhage.

Hæmatoma.—Hæmorrhage into the pelvic tissues may take place during pregnancy, at the time of labour, or very shortly after the child is born. When it occurs at the end of pregnancy or early in labour, the swelling may obstruct the labour (see page 33). In the case where the swelling appears, shortly after the child is born, the vessel has been torn during the labour, but there has not been time for the blood to make its way down to the vulva, or the pressure of the presenting part has prevented bleeding, so that little or no blood has been poured out, until the birth of the child. During pregnancy, the veins of the broad ligament, vagina, and vulva frequently become very varicose, and an injury to any of them will cause profuse bleeding. If the injured vein is not opened into from the external surface, the poured-out blood quickly forms a large swelling in the loose areolar tissue if there is no pressure, as from the presenting part, and the blood gradually gravitates as low as possible, until a hæmatoma forms at the side of the vulva. If one of the very large venous sinuses in the broad ligament were to rupture into the peritoneal cavity, the profuse bleeding would probably cause the death of the patient in a few minutes. Fortu-

nately, when a rupture does occur, it is usually into the areolar tissue, and not into the peritoneal cavity, and the bleeding is thus circumscribed, and not likely to be fatal. The amount of blood poured out will depend upon the size of the ruptured vein, and also upon the laxity of the tissues. As I have already said, the blood makes its way towards the most dependent part, and if it comes near the surface, the skin becomes black.

Signs and Symptoms.—Unless the bleeding is great, there will not be indications of collapse. The patient usually complains of a bearing-down sensation, as if there were something to come away from her.

Diagnosis.—A vaginal examination will reveal a somewhat fluctuating swelling in the pelvis. If it is in the broad ligament, it will be to one or other side of the uterus ; but it is generally in the side or back wall of the vagina, causing a bulging into that passage. It may burst into the vagina, and then a tear will be found in the vaginal wall, and the finger can be passed into the cavity which is full of clot. As a rule, in a few hours the skin at the side of the vulva will become black. The bearing-down feeling, of which the patient complains, is much the same as is felt in inversion of the uterus, so be careful to examine the uterus, for fear it may be a commencing inversion.

Prognosis.—There is not much risk, unless the clot becomes septic, and even then prompt evacuation of the clot and free drainage should save the patient's life. In the broad ligament it might burst into the peritoneal cavity, and cause the patient's death.

Treatment.—Stimulate the patient, if she requires it, and try to get the effusion absorbed. Absorption will usually be rapid, unless the clot becomes septic, so the strictest aseptic precautions must be taken. If the clot

becomes septic, the temperature rises, and there will probably be rigors. A free incision should be made, and the cavity should be cleared out and plugged with iodoform gauze. If the skin or mucous membrane covering the swelling shows indications of sloughing, do not wait for the clot to become septic, but make a free incision and clear it out. When there is a tear in the vaginal wall, turn the clot out and plug the cavity. If the cavity extends down by the side of the vulva, make an incision through the skin and put in a gauze drain.

Deciduoma Malignum or **Chorio - Epithelioma**. — Sanger, in 1888, was the first to draw attention to this disease as a sarcoma of the decidua serotina. The pathology of the condition is hardly yet settled, but whatever may be ultimately decided to be the true pathology, it is quite certain that the condition is an exceedingly malignant one, sometimes arising in the uterus after a full-time labour, more frequently after an abortion, and especially after the discharge of a mole. It gives rise to excessive and repeated hæmorrhages late in the puerperium. Metastatic deposits soon form in the vagina, and different organs, such as the lungs, liver, and brain, etc. The patient rapidly wastes away, and probably dies within a few months of the first indication of the disease.

Symptoms.—The most characteristic indication is severe intermittent hæmorrhage following labour, or an abortion, especially of a hydatid mole. Very soon a foul-smelling, watery discharge comes on, the same as with an ordinary cancer of the uterus. The patient may not suffer much pain except when clots are being expelled. Emaciation soon begins, and when metastatic deposits form in the lungs there will be cough, pleuritic pain, breathlessness, and blood-stained sputum.

A secondary deposit in the brain will cause cerebral symptoms and, it may be, severe hæmorrhage.

Diagnosis.—In all cases of irregular hæmorrhage occurring after labour, or an abortion, a careful examination of the uterus should be made. The uterus will be found more or less enlarged. The vagina may be full of clot, and a secondary growth may be found in its wall. The cervix is generally found gaping, but it may be closed. A digital exploration of the uterine cavity will reveal clots and a soft, vegetating mass. The uterine wall is soft, and may be easily perforated. A portion of the mass should be removed by the finger or curette for microscopic examination. If there are metastatic deposits in the lungs, patches of dullness, with tubular breathing and perhaps pleuritic friction, can be made out. It may be mistaken for advanced phthisis, so an examination of the sputum for tubercle bacilli should be made.

Prognosis.—The condition is an exceedingly grave one, and there is little hope of saving the patient, unless the case is properly treated in the early stages. If metastasis has occurred, the case is hopeless.

Treatment.—Complete hysterectomy, preferably by the vagina. A preliminary curetting may be done to check the hæmorrhage, and for diagnostic purposes, but from a curative point of view it is useless. When metastasis has occurred, the advisability of an operation is very questionable, except to check hæmorrhage, when a curetting will usually suffice.

CHAPTER XV.

CARDIAC AND PULMONARY COMPLICATIONS.

Cardiac Disease.—Under ordinary conditions heart disease in any of its forms is a very serious complaint. When it occurs in pregnancy, or when, as is more usual, pregnancy occurs in a patient with a cardiac lesion, the gravity of the condition is very great. The condition is dangerous during the pregnancy, but the acme of risk is reached during the labour, or within a very short time after delivery.

In a pregnant woman the heart has an extra amount of work to do, to supply the wants of the enlarged uterus. When the heart is healthy, nature easily provides for this, by a certain amount of hypertrophy, and specially of the left ventricle, on which the extra strain principally falls. If the heart is diseased in a non-pregnant woman, as in a man, nature tries to remedy matters by a compensatory hypertrophy, and the patient may go on fairly comfortably for years, so long as the compensation is sufficient. If, however, an extra strain should be thrown upon the heart, failure of compensation will probably result, and if the strain is sudden and severe, heart failure may cause death. During pregnancy the increased strain may cause failure of compensation, and the severe strain during delivery may cause sudden death from heart failure. The strain does not, except in bad cases, begin to tell upon the heart, until after the placenta is fully formed, so

it is only in the latter half of pregnancy that there is distinct evidence of failure of compensation. The patient suffers from breathlessness, palpitation, and cough. Œdema of the legs and body will come on, and also ascites. The lungs will also become œdematous, and bronchitis or congestion follow, and the patient may not be able to lie down. She may put up considerable quantities of blood in her sputum, and albumin will be found in her urine. These bad symptoms do not manifest themselves until after the middle of pregnancy, and as the strain upon the heart progressively increases, they will get worse as pregnancy advances, unless proper treatment is adopted. The accumulation of carbonic acid in the blood may cause uterine contractions, and premature labour come on. In bad cases, this is the best thing that can happen, as once the uterus is emptied, the extra strain is taken off the heart. As we shall see, in some cases, it may be necessary to induce premature labour.

Heart disease is certainly a serious complication during pregnancy, but the acme of risk is reached during labour, or in some cases very shortly after delivery. While pregnancy throws a continuously increasing strain upon the heart, this is markedly increased during labour, so that a heart which has just been able to carry on its work, and no more, may very easily be overpowered by the extra strain of labour. While there is risk of failure of the heart during the actual stress of labour, there is also considerable risk of its being paralysed immediately after the birth of the child. This is specially seen in cases where the right side of the heart is very much dilated, as with mitral stenosis. When the second stage of labour is over, the retraction of the uterus cuts out of the circulation the greater part of the uterine blood, and this is

returned to the right side of the heart, unless a considerable amount has been lost post-partum. The result is over-distention of the right side of the heart, and if there has been much dilatation, paralysis of the organ ensues (Fig. 58). If this explanation, which Berry Hart strongly insists on, is the true one, mani-



FIG. 58.—Section of a heart with mitral stenosis in a case of sudden death at the end of labour. (Hart.)

festly, post-partum bleeding should be encouraged in all cases where the right side of the heart is dilated ; and if cardiac embarrassment comes on, and there is no post-partum bleeding, one should not hesitate to open a vein and draw off a sufficient amount of blood to relieve the engorged heart. I thoroughly agree with Hart in this, and have always based my treatment upon the truth of this assumption, with exceedingly good

results. I have only once found it necessary to open a vein to relieve the engorged heart, with a most striking result. The tremendous distress rapidly decreased as the blood flowed from the vein, and the patient, who was apparently dying, was soon made fairly comfortable. She recovered, and within a year she again passed through a pregnancy, and the labour ended without discomfort, but during the latter half of this second pregnancy she was in the hospital under treatment, and fair compensation was maintained.

Diagnosis.—This is made in the usual way by the detection of the murmur or murmurs. The cardiac area will usually be increased, and the position of the apex beat displaced outwards. A slight blowing, systolic murmur may often be detected at the apex, but this may not indicate any disease. A certain amount of dilatation of the heart may occur during pregnancy, and this, by stretching the mitral opening, may allow of slight regurgitation, but it is of no consequence, as it will disappear after delivery. In anæmic cases, soft, blowing murmurs must not be taken as indicating cardiac disease, but, on the other hand, it must not be forgotten, that very bad anæmia sometimes accompanies the disease. However, in such cases, a gross lesion will be present, and there should be no difficulty in detecting it.

Prognosis.—During pregnancy the condition is a serious one, but it is not nearly so hopeless as Macdonald and others have maintained. If it is possible to have the patient under proper treatment, the risk is not very great. The strain upon the heart may shorten the patient's life, but, with proper care, she should be carried safely through the pregnancy and labour, except in very bad cases. I have never yet seen a case which died of cardiac disease during pregnancy, and the very

few cases which have died during or after labour have been cases which were not under treatment during pregnancy. In cases which have not been under treatment during pregnancy, undoubtedly, the risk during labour is great, but with judicious treatment even they may be carried safely through the labour and puerperium. Pure mitral stenosis is said to be the most dangerous of all the lesions, but this has not been my experience. The lesion I fear most is a double aortic, and next mitral stenosis, if it is at all marked. Aortic incompetence is said to come next to mitral stenosis, but I believe mitral stenosis and incompetence combined, are more dangerous. Mitral incompetence is not very serious, unless it is very marked. In my experience, a single lesion, unless it be a marked one, is not so serious as a double one. If you have a double one, the probability is that they are both well marked, and the danger is therefore great. Repeated pregnancies are bound to tell upon a damaged heart, and patients should be warned of this.

Treatment during Pregnancy.—During pregnancy, every care should be exercised to prevent any more strain upon the heart than naturally arises from the pregnancy. The woman should not exert herself any more than is absolutely necessary, and she should rest as much as possible. In mild cases, drugs may not be necessary, but if there is any tendency to failure of compensation, they must be administered. Strophanthus is said to be a pure cardiac tonic, and on that account I prefer it, but digitalis is perhaps as useful. Strychnine is also most useful. As a rule, the cardiac tonic will not have to be given until after mid-term. Unfortunately, cases are often seen for the first time when compensation has failed badly, and the lungs are affected and dropsy present. The patient will probably

not be able to lie down. Carbonate of ammonia should then be combined with the cardiac tonic. Cupping the base of the lungs is useful, and large poultices relieve the congestion. A diuretic may be combined with the tonic. Where there is any failure of compensation, the patient should be kept on the cardiac tonic during the remainder of the pregnancy. If the heart does not respond to the treatment, and premature labour does not come on, it should be induced.

Treatment during Labour.—At the commencement of labour, give a large dose of *strophanthus* or *digitalis*. The first stage should be allowed to run its course naturally, provided it is not too prolonged, and that no cardiac embarrassment begins to manifest itself by cyanosis and difficulty of breathing. If the patient is becoming exhausted, or the heart embarrassed, artificial dilatation and immediate delivery should be resorted to. There is no particular risk in giving chloroform, but in some cases ether is preferable. As soon as a patient passes into the second stage of labour, and begins to bear down, the strain upon the heart is enormously increased; therefore, in cardiac cases, the second stage should be done away with, or cut as short as possible. This can easily be done by applying forceps, or doing version, as soon as the os is fully dilated. During the third stage of labour, free bleeding short of post-partum hæmorrhage should be encouraged by allowing the uterus to relax. Ergot should not be given, until sufficient blood has been lost to prevent engorgement of the right side of the heart. If the patient should show marked cardiac embarrassment, and there is no bleeding from the uterus, at once open a vein in the arm and draw off sufficient blood to relieve the heart. A pint or even more may be taken. Strychnine and digitalin should be given freely hypodermically.

During the puerperium, the cardiac tonic should be continued until compensation is secured. The patient should not be allowed to suckle her child, not only because she will be weak, but also because lactation has a bad effect upon a damaged heart.

If a woman has run a great risk during labour, she should be warned against the risks of a future pregnancy. If she should again become pregnant, the question arises, should that pregnancy be allowed to go on, or should an abortion be procured? If compensation has never failed, except during the previous pregnancy, she may be carried through the second pregnancy with safety, but she must be under careful treatment all the time. If compensation has failed when she was not pregnant, then, I think, an abortion should be procured before the end of the third month.

PULMONARY COMPLICATIONS.

Bronchitic affections are not infrequently met with at the time of labour, but unless the attack is an acute one, and the breathing is embarrassed, no interference will be called for, unless there is some other indication present. If the breathing is embarrassed, the labour should be shortened, by whichever method is most suitable. The subsequent treatment of the condition would be on general lines.

Pneumonia.—Pneumonia in pregnancy not infrequently causes the uterus to empty itself. This is apt to occur at the crisis. The uterus may become infected with the pneumococcus. This organism is occasionally found in the discharge in cases of puerperal fever.

The pneumonia must be treated in the usual way, and, if labour comes on, the strictest aseptic precautions

must be exercised. If there is much embarrassment of the breathing, it may be necessary to hasten delivery.

Phthisis Pulmonalis.—There is no doubt that the influence of pregnancy upon phthisis pulmonalis is bad. Not only will it aggravate the disease, but it may bring on an attack in a patient who has a predisposition to tuberculous disease. The gestation may be interrupted. The excessive coughing may cause separation of the placenta and accidental hæmorrhage. If full term is reached, the patient may be so exhausted as not to be able to stand the strain of labour; but in most cases labour will not be severe, as the child will be puny, and the emaciation will have lessened the resistance of the soft parts in the pelvis. Artificial delivery may be necessary, if inertia uteri comes on, and it should be done early, to save exhaustion. After delivery, the disease generally progresses rapidly, and if the case is at all an advanced one, a fatal issue may be looked for in a very few weeks. The child will be puny, if born alive, and it will probably die within a few weeks.

Prognosis.—If the disease is marked, the prognosis is exceedingly grave.

Treatment.—This should be on the usual lines. If the patient is seen early in pregnancy, and she is evidently losing ground, then I would have no hesitation in advising the procuring of an abortion. In the later months of pregnancy, induction of labour might be called for, but it would not be so likely to benefit the patient, and might only hasten matters.

Emphysema.—True emphysema of the lungs is aggravated by pregnancy, but it is not likely to interfere with labour; but there is a subcutaneous emphysema which occasionally occurs during labour, and gives a somewhat alarming appearance to the patient. One

explanation of the condition is that, during the severe straining of labour, a superficial air vesicle at the apex of the lung ruptures, and the air forces its way through the tissues and causes a puffy swelling in the neck, face, and upper part of the chest. Another explanation is, that the trachea or a bronchus ruptures during an expiration associated with a violent effort or cry. Wherever the air comes from, it suddenly expands the tissues of the neck, face, and upper part of the chest, and a crackling sensation can be perceived on pressing upon the swelling. The condition is alarming to the patient, but there is practically no risk from it, as the swelling quickly subsides after delivery.

Diagnosis.—The appearance of the face is not unlike that in a case of nephritis, only the swelling of the face is more marked on one side than on the other. On palpating the swelling, you will at once feel a crackling sensation, and the history of the sudden appearance of the swelling during labour should make the diagnosis easy.

Treatment.—Deliver the patient as soon as possible by whatever method is most suitable. So far as the swelling is concerned, no treatment is necessary, as it will disappear in a few days.

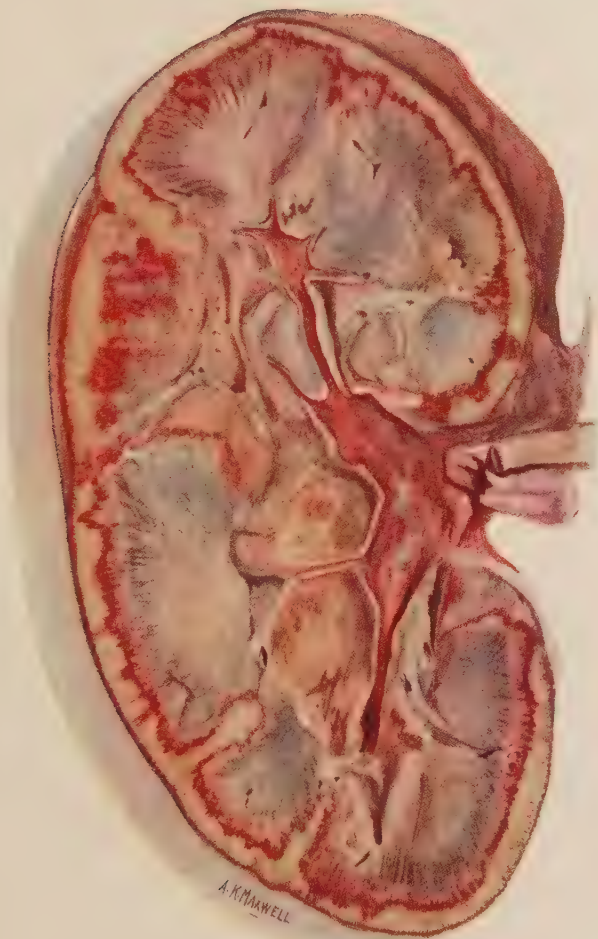
CHAPTER XVI.

ECLAMPSIA.

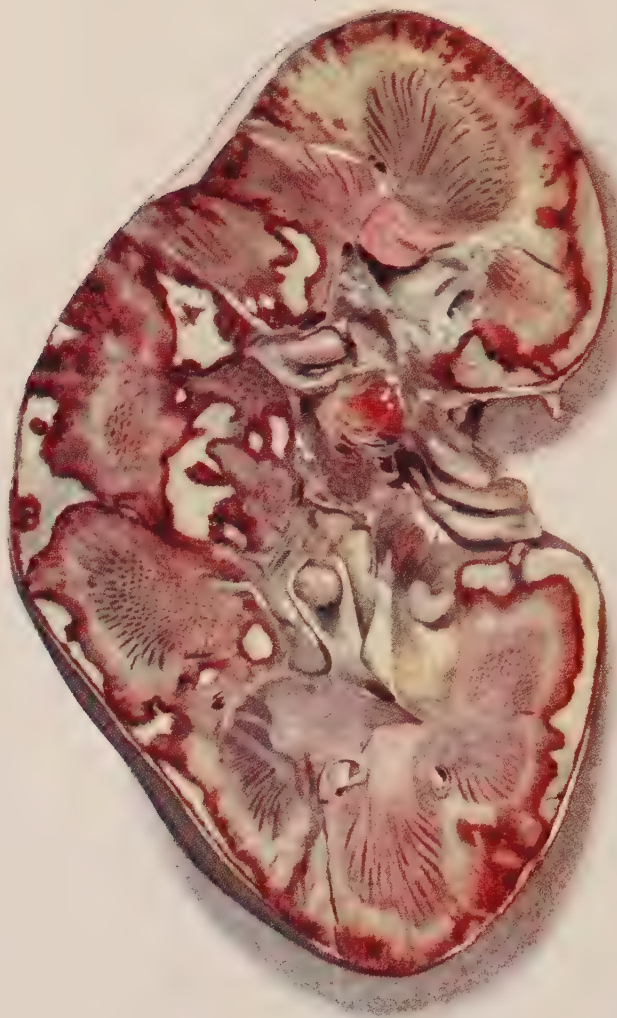
Eclampsia may arise during pregnancy, labour, or the puerperium, so we shall deal with it as a complication not only of labour, but also of pregnancy and the puerperium. When the fits begin during pregnancy, they may cease before the onset of labour, but they may continue throughout the labour, and in some cases throughout the early part of the puerperium. When they begin during labour, they may cease with the delivery, but they are often continued into the puerperium. When they begin during the puerperium, they are of course confined to that period.

Cause of the Fits.—Many theories have been advanced, but none of them are satisfactory, and it would serve no good purpose to discuss them. Pregnancy is a physiological condition, but it borders dangerously upon the pathological. A new element is imported into the woman's economy, by the pregnancy, as the uterus and its contents are both rapidly growing, and giving rise to an enormous amount of tissue metabolism. Not only has the foetus to be supplied with nourishment, but its blood has to be purified of noxious substances. So, in addition to the ordinary waste products of tissue metabolism connected with active growth, the waste products of the foetus have to be got rid of. The excre-

PLATE I



INFARCTION OF THE CORTEX OF THE KIDNEY



INFARCTION OF THE CORTX OF THE KIDNEY

tory organs of the woman, therefore, have to do double work, *i.e.* they have to purify the mother's system not only from her own noxious substances, but also from those arising from the uterine contents. What the products of tissue metabolism are, which are formed in the uterus and its contents, we do not know, but, judging from the rapid growth and development which are taking place, there must be a large amount of them. In the very great majority of cases the excretory organs are equal to the task, and no harm arises, but if any of them should fail, the system quickly becomes poisoned, and, if the poisoning becomes excessive, convulsions result. The kidneys are the excretory organs to which most attention has been paid, and they are the ones which are most at fault ; but the liver is also affected, and in some cases markedly so. The urine becomes scanty and more or less loaded with albumin, and blood may be present. The urea and uric acid diminish in amount. Nephritis may be present, but in the majority of cases there is no actual disease, though the condition arises which is known as the *kidney of pregnancy*. The kidneys are slightly enlarged and somewhat anæmic, with some fatty infiltration of the epithelial cells. In these cases, the albumin in the urine may be quite as copious as in cases of real nephritis. Blood may also be present, and fatty, and hyaline, casts are found. Within a day or two of delivery, the albumin disappears from the urine, or only a faint trace remains for a couple of days longer. If nephritis is present, after delivery the albumin in the urine lessens, but not so rapidly, and traces of it may remain for weeks. Occasionally there is complete suppression of urine, and if the flow is not quickly re-established, death is inevitable. These patients may live for four or five days, and the curious thing is that they do not present the usual indications

of uræmia. I have seen four such cases, in all of which there was destruction of the cortex of the kidneys from infarction (coloured plates). I have seen an exactly similar condition of the kidney in a case of concealed accidental hæmorrhage. There was copious albumin in the small amount of urine obtained, but the patient did not have fits.

The amount of liver involvement varies very much. In some, practically no naked-eye changes can be seen, while in others there are hæmorrhages under the capsule and throughout the liver substance (coloured plate). Changes can be observed in some livers which somewhat resemble the early stages of acute yellow atrophy. Jaundice of a more or less marked type may arise. When the liver is much involved, the case will probably end fatally.

The toxin seems to act upon the kidney substance very much as turpentine and cantharidine do, and probably the liver is acted on in the same way, and when one or both of these organs have their functions disturbed, there is a rapid accumulation of toxin in the blood. A vicious circle has been formed, and convulsions will result, unless the excretory functions of the affected organs are quickly restored. It is a well-known fact that, if the kidneys can be got to act well, convulsions will be prevented.

The nervous system of a pregnant woman is usually in a more or less unstable condition, and very little will upset it. The toxin, whatever it may be, acts as an irritant upon the nerve centres, and causes headache, disturbance of vision, and finally a furious nerve storm in the shape of general convulsions.

If the maternal system is poisoned, one would naturally expect the foetus to suffer, and there is no doubt that it does. The toxin acts upon the foetus in the

PLATE III



REPRODUCTION OF A WATER-COLOUR DRAWING OF A LIVER
FROM A CASE OF ECLAMPSIA

same way as upon the mother. The fœtus often perishes, and it has been observed to have convulsions *in utero*. If it is born alive, it may have convulsions shortly after birth. The fœtal kidneys are affected in the same way as the maternal ones, and albumin will be found in the urine. I have also found albumin in the urine of children where the mothers had had albuminuria, but had been saved from having convulsions by prompt treatment.

It has been asserted that on the death of the fœtus *in utero* the albumin quickly disappears from the mother's urine. I believe this is a mistake, as I have treated many cases of eclampsia with highly albuminous urine, in which the fœtuses were so badly macerated, that they must have been dead for several weeks.

Cases of eclampsia have been published in which no albumin was found in the urine. I have seen cases of convulsions during labour without albumin in the urine, but they were not true cases of eclampsia. They were cases of epilepsy, as was borne out by the history of epileptic fits prior to the pregnancy. In every case of eclampsia which has come under my observation, albumin has been present in the urine, and generally to a very marked degree.

Recurrence of Eclampsia.—A woman who has passed through an attack of eclampsia naturally dreads a recurrence in subsequent pregnancies, but, if she does not suffer from chronic nephritis, you need not hesitate to reassure her. She runs no more risk than a woman who has not had an attack. Olshausen has estimated the recurrence at 1 per cent, and this is probably near the mark, taking the cases all over. If, however, a woman is the subject of chronic nephritis, undoubtedly, if she again becomes pregnant, she will run a very

serious risk of eclampsia, unless she is very carefully treated during the pregnancy. In all the recurrent cases which I have seen, there have been indications of chronic nephritis, and I am convinced that these are the cases in whom recurrent attacks are to be expected, and who should be warned against the risk of pregnancy.

A number of cases have been recorded which presented all the clinical indications of eclampsia without any fits occurring. I have myself seen several such cases.

Time of occurrence of the Fits.—The fits may occur at any time during pregnancy, but rarely before the third month. I have seen a case at the fourth month, but cases have been observed earlier than this. They are most frequent from the seventh month onwards. Under treatment the fits may cease, and the pregnancy go on to full time; but in many cases they do not cease until the uterus is emptied, and in some cases they even continue into the puerperium. The first seizure may be during labour, and there may be no more fits after the child is born, but they may continue during the first few hours or days of the puerperium. Again, in some cases, the first seizure is after the labour is over, generally in the first few hours of the puerperium, but, occasionally, some days later. The fits begin during labour in about one-half of the cases, but in a good many of these the patient has not reached full time; in about one-third of the cases the onset is during pregnancy, before labour has begun; and in the remaining one-sixth they begin during the puerperium.

Premonitory Signs and Symptoms.—The patient usually shows more or less œdema of the feet and legs, and the body and face may also be involved. In some cases, the labia are very much swollen (Fig. 59). Occa-

sionally, there is no œdema, not even of the feet, or it is so slight that it is not observed. In severe cases, there may be marked œdema of the lungs. The patient complains of severe headache, specks floating before her eyes, and temporary failure of vision, which in the actual seizure may go on to complete blindness. This blindness is only temporary, as it passes off after delivery, but there may be some permanent impairment



FIG. 59.—Edema of the vulva.

of vision. Hemorrhages into the retina often occur. Sickness is often complained of, with severe epigastric pain, just before the onset of the fits. The urine has decreased in amount, and in some cases, there may be total suppression. It may have a normal appearance, but in some cases, it will be seen to be loaded with blood. Albumin will be found present; in some cases, in such a large amount that the urine becomes solid on boiling. The urea and uric acid will both be markedly

diminished. Various tube-casts, especially epithelial and hyaline ones, and much epithelial débris will be seen under the microscope.

In the majority of cases, premonitory signs and symptoms are present, but, occasionally, the fits come on without the patient having complained of feeling out of sorts. Yet, even in these cases, the urine will be found to be loaded with albumin.

The Seizure.—The fits closely resemble epileptic fits ; in fact, it is impossible to distinguish between the two. There is no aura, and no cry, as in an epileptic seizure. There is an invasion stage, quickly followed by a tonic one, in which the jaws are tightly clenched, and there is rigidity of the muscles generally. The breathing is interfered with, and the patient's face becomes cyanosed. The tongue or cheek is often bitten as the jaws snap together, and in these cases, bloody froth issues from the mouth. The tonic stage lasts for a few seconds, and is followed by the clonic one, in which the twitchings of the muscles become general. Occasionally the convulsions are one-sided, but in the great majority of cases they are bilateral. The breathing is very stertorous. This stage may last for a minute or two. The whole fit will probably be over in a couple of minutes, or three at the most. Fits are sometimes said to last for twenty minutes, but in such a case, the patient is probably passing from one fit to another without any perceptible interval. The clonic stage is succeeded by coma, more or less pronounced. In slight cases, the condition is perhaps better described as one of stupor, which quickly passes off. The state of coma may pass off in a little, but in many cases it lasts until another fit comes on, and it deepens as the fits succeed each other. The fits may be few in number, or there may be upwards of two hundred of them. They may recur at

short intervals, or there may be several hours between them. If the patient survives, the coma gradually passes off after the fits cease, but it may last for one, two, or even three days before the patient regains consciousness. Frequently, the patient's mind is not quite clear for a day or two after the coma has ceased. At first, her cerebration will be very slow, and she will remember nothing about her seizure. Many patients forget all about things which had occurred shortly before the seizure.

During the fits, the pulse will be very rapid and the tension high. The temperature will also be raised. The pulse rate will lessen in the intervals, but it may remain rapid for some days after the fits have ceased. The temperature also often remains up two or three degrees for a few days.

Frequency. — Among ordinary private patients, eclampsia occurs about 1 in 300 cases ; but in hospital work it is much more frequent. In the Glasgow Maternity Hospital indoor cases, the average in some years is fully ten times this. It is much more frequent in primiparæ than in multiparæ. It is also more frequent in unmarried primiparæ than in married ones. When it occurs in multiparæ, chronic nephritis is often present, and in many of the cases, the patients are nearing the end of the child-bearing period. It has been observed that climatic conditions influence the occurrence, and I have often verified this. If there is a sudden lowering of the temperature at any time of the year, we almost invariably find that cases of eclampsia are sent into the hospital, sometimes several in one day. I have had five cases to deal with in one day in my hospital and private work. The explanation of this climatic influence is that those patients suffering from albuminuria have had their skins chilled by a sudden lowering of

temperature, and a greater strain has been thrown upon their kidneys than those organs could bear, and the amount of toxin in the blood has increased sufficiently to cause the fits. This exposure of the skin to chilling is of great importance, and it has a marked influence in determining the result of treatment in hospital cases. If a patient is brought to hospital from a considerable distance on a cold night, the chances of saving her life are exceedingly small, unless she has been kept very warm during the removal.

Diagnosis.—The condition can hardly be mistaken for anything else, but one must bear in mind that fits may arise from epilepsy, hysteria, or brain lesions. The epileptic fits are exactly the same in appearance, but you will generally get a history of previous epileptic seizures. The presence of albumin in the urine cannot be taken as indicating eclampsia, as you often get it in epilepsy, especially in pregnancy. There is one form of epilepsy which is exceedingly difficult to diagnose from eclampsia, and that is the *status epilepticus*. There may be albumin present in the urine at the commencement, but it will probably disappear, and yet the fits continue in rapid succession. I have seen several cases of this. At first there was a small amount of albumin in the urine, but it quickly cleared up, and yet the fits continued to recur in rapid succession. In one of my cases, there were 774 fits in 88 hours from the onset until death, but during 14 of these hours there were no fits. In one hour there were 32 fits, and during the last 24 hours there were 407, and in the last 12 hours no less than 261. Fortunately, such cases are exceedingly rare, but they must be borne in mind. A history of previous epileptic seizures may be obtained, but this is not invariably the case, as the first manifestation of

epilepsy may be during pregnancy. If you obtain a history of previous attacks, you may diagnose the condition without difficulty, even if albumin is present in the urine. With hysterical fits, you will have the usual manifestations of hysteria, and, if there is no albumin in the urine, you may be quite sure of your diagnosis.

In brain lesions, you must be guided by the history, the paralysis, the eye conditions as regards the pupils, etc., but you must bear in mind that hæmorrhages into the brain are occasionally found in eclamptics. I have seen a good many of them, and, in some cases, have been able to diagnose them prior to death; but often they are not diagnosed during life, and only discovered at the post-mortem examination. The reason of this is because the patients are deeply comatose, and you cannot make out any paralysis. The difference in the pupils may assist you, but even that may be fallacious, as you occasionally find this in eclamptics without any brain lesion. In one case I confirmed my diagnosis, by drawing off an ounce of cerebro-spinal fluid which was mixed with blood. An extensive hæmorrhage was found at the post-mortem examination.

Prognosis.—The condition is an exceedingly serious one. The death-rate given by different authors varies very much. It is difficult to give anything like an accurate estimate, because one's statistics have to be taken from hospital records to get anything like a reliable number of cases, and many cases sent into hospital are beyond hope when admitted. Probably about 20 per cent of the cases are fatal, but if the patients are seen early and prompt treatment adopted, better results should be got. In a series of twenty-two consecutive cases treated some years ago I lost three, but one of them died of a perforating duodenal ulcer after

the eclampsia had been cured. Including this case, it gives a death-rate of 13·64 per cent.

In my experience, the prognosis is gravest in cases occurring during pregnancy, less grave in those occurring during labour, and least grave in those occurring during the puerperium. Some authorities state that those beginning during the puerperium are the most dangerous, but I have not found this so. The earlier in pregnancy the onset is, the graver is the condition, and the same is true regarding labour. In my experience, the prognosis is more favourable among multiparæ than among primiparæ, but this is the reverse of what has usually been found. Roughly speaking, the more numerous the fits the graver is the outlook; but occasionally one sees cases which die after one or two fits, while others survive after having had as many as 200. One of my cases recovered after 207 fits. The cases which are fatal after a few fits are usually profoundly comatose from the first, and have almost, if not complete, suppression of urine. If the fits are frequent and severe, with deepening coma, the outlook is exceedingly grave. As regards the urine, the principal factor to be taken into account is not the amount of albumin present, but the quantity excreted. If the quantity is small, and does not rapidly increase under the treatment, the prognosis is very grave. A patient with a small quantity of albumin in her urine may have a fatal attack, while one with solid albumin may recover. The presence of blood does not necessarily mean a bad prognosis. An exceedingly quick pulse with high tension is a bad indication, if it does not soon incline to slow down. The temperature is usually raised for several days, but this is of no significance.

The prognosis for the child is very bad. After the fits the chances for the child are exceedingly small. If

it is born alive, it may die of convulsions or of general debility. If forcible delivery is adopted in the interest of the mother, the child may have to be sacrificed. Probably not more than 40 per cent of the children ultimately survive.

Treatment.—As we do not know the cause, our treatment must necessarily be empirical. No doubt we have to deal with a toxin, but, until we discover what that toxin is, we are groping in the dark, and there seems little chance of our hitting upon an antidote. It seems to me that the most rational method of treatment at present is to try to rid the system of the toxin, through the usual channels of excretion, viz. the bowels, the kidneys, and the skin. This is the method of treatment which I have now used for many years, with much better results than I formerly obtained.

Preventive Treatment.—In the first chapter I spoke of the importance of keeping pregnant patients under observation during the latter half of pregnancy, and examining their urine from time to time. If it were possible to do this, and to promptly treat every case in which albumin appeared in the urine, there would be few, if any, cases of eclampsia to deal with. If a woman, pregnant for the first time, engages a doctor to attend her, he certainly should insist on obtaining specimens of her urine from time to time, and he should warn her to consult him, if she feels out of sorts. He should also warn her to have a daily evacuation of the bowels. With multiparæ it is not so important to examine the urine frequently, but, if a doctor is aware that the woman has ever had an attack of nephritis, he should certainly insist on getting the urine to examine.

When albumin is found in the urine, treatment should be begun at once. The bowels should be kept freely

moved, by saline purges and diuretics, such as the citrate and acetate of potash, and imperial drink should be given to increase the flow of urine; but what is of greater importance than drugs, is proper diet. If there is much albumin, the patient should get nothing but milk for a few days. In slight cases, milk diet may be allowed, but meat should be prohibited. Another point of importance is, that the patient should be kept warm, and to ensure this, her bed is the proper place for her. I have already referred to the bad effect that a chilling of the skin has on such cases, by throwing an increased strain upon the kidneys.

If the case is one of the "kidney of pregnancy," the albumin will quickly diminish, and the amount of urine excreted will rapidly increase. The albumin may disappear completely, but even if it does, the patient must be kept under observation. Active treatment may not be necessary, but she must take little or no meat, and keep her bowels very freely opened. Milk diet should be largely used, and plenty of fluids taken. A tumblerful of hot water the first thing in the morning is very beneficial, as it helps to flush the system.

If the albumin does not decrease, and there is evidence of serious kidney mischief, indicated by granular tubercasts and the small amount of urine excreted, then the question of the advisability of terminating the pregnancy arises. Occasionally it will be necessary to do this, but not very often. In making up your mind as to the advisability of emptying the uterus, be guided, not so much by the amount of albumin present, but by the amount of urine excreted. If there is a copious flow of urine, even with a fairly large amount of albumin, the pregnancy may be allowed to go on, but if the flow of urine is scanty, even with a comparatively small amount of albumin, it will probably be well to end the

pregnancy. Just as in actual eclampsia, it is the amount of urine, and not of albumin, which is of importance.

The preventive treatment of eclampsia is most satisfactory, if the patient is seen in time, but the same cannot be said of the curative treatment when the fits have begun.

Curative Treatment.—This is largely based upon the same lines, but it has to be more active. The first thing to do is to prevent the woman from injuring herself. She should be kept in bed, and to prevent her biting her tongue or cheek, a folded towel, a rubber gag, or something similar should be placed between her teeth at the onset of a fit. If she should be up when a fit comes on, she will fall, and she may injure herself. I have seen a case with a dislocation of the shoulder. She was in the bath-room, and fell against the bath. While I was treating her, she had several fits, and she cried out in each of them. This is the only eclamptic I have ever heard cry out. After the delivery the doctor told me about the fall, and when we examined the shoulder, we found it was dislocated and reduced it. The severe pain in the shoulder during the struggling in the fits had caused her to cry out.

To control the fits different drugs are used, chloroform frequently, but I do not believe very much in its use. If a patient is very restless, I generally use large doses of chloral and bromide, injected into the rectum. These drugs cannot be given hypodermically without great risk of sloughing occurring. Morphia is a favourite drug with many, but I do not care much for it, as I believe it interferes with the excretion of urine. Years ago I gave a trial to veratrum viride, but gave it up, as I found the preparations were not reliable. Within the last few months I have been using veratrone, the

active principle of *veratrum viride*, and have got very good results from it. It is put up in 1 c.c. doses for hypodermic use. This is the full dose. It has a very marked effect in lowering the pulse rate and tension, and it tends to check the fits.

If we can remove the cause, the fits will stop of themselves, and that should be our aim. The bowels should be cleared out as thoroughly and as quickly as possible, by means of enemata, and large doses of magnesium sulphate, jalap, or croton oil. There is some risk of causing œdema glottidis, if croton oil is painted on the back of the throat. If the patient cannot swallow, wash out her stomach and give the purgative through the stomach tube. Very large doses must be used.

To act on the kidneys, I use injections of normal saline solution with one drachm of acetate of soda added to each pint. At least two pints are given under the breast, or directly into a vein. After delivery, the injection can be given into the loose abdominal wall. If the patient can swallow, she should be given as much fluid as she can be got to take.

Bleeding is a very old method of treatment, and in many cases it is most useful. If the patient is plethoric, you may draw off from fifteen to twenty ounces of blood from a vein in the arm, being guided as to the amount by the effect upon the pulse. You can then directly transfuse the saline solution. Some of the toxin will be removed in the blood taken away, and the remainder will be diluted by the saline. It has been suggested that the blood of eclamptics is acid, and the alkali introduced neutralizes the acid and does good in that way, but it is for its diuretic effect I use it. If you can get a free flow of urine quickly established, the patient will probably recover.

To get the skin to act, you may give the patient a hot bath, a vapour bath, or a hot pack. A hot pack is the most convenient. The patient should be left in the pack for half an hour, and after that she should be surrounded with hot-water bottles to keep up the sweating. The hot-water bottles must not be allowed to touch her skin, or a blister will be caused. The vitality of the skin is so low that a hot-water bottle, which could be quite well tolerated against the skin under ordinary conditions, will cause a burn in an eclamptic. For the same reasons, if poultices are applied across the loins or on the chest they must not be put on too hot. I have admitted an eclamptic patient to hospital with the whole of her loins one big burn from poulticing. If a blister forms, you will have the greatest trouble in getting it to heal.

Pilocarpin is a drug which will cause profuse sweating, but it is a dangerous drug, as it causes a copious secretion of fluid in the lungs, and as the lungs are generally oedematous, this is a very real danger. The patient may be drowned by her own secretions, so to speak. Besides this action, the depressant action of the drug is dangerous.

If the patient's pulse is weak, stimulate her freely with strychnine and digitalin hypodermically, and alcohol by the mouth or rectum. Washing out the colon with saline solution is strongly recommended, but I do not believe it is possible to inject fluid into the colon before delivery. Rectal saline injections are useful, and about half a pint should be given every three or four hours, with an ounce or two of whisky or brandy in each.

If you can get the bowels, kidneys, and skin to act well, the outlook is good, and you may wait for a natural termination of the labour.

Obstetrical Treatment.—Some advise that in every case the uterus should be emptied as speedily as possible, regardless of whether or not the woman is in labour. Others, again, hold that the uterus should not be interfered with, unless the fits do not lessen in frequency and severity. I have tried both methods, and have got better results with the latter. If labour has not come on, do not induce it, unless the patient is evidently growing worse. If labour has commenced, allow it to go on naturally, at all events until the os is fully dilated, when you may hasten delivery; but if the patient's condition is growing worse, hasten delivery, even if you have to dilate the os artificially. In many cases, the labour can be allowed to terminate naturally. If there is post-partum bleeding, do not check it too soon, but allow a fair amount of loss, as this will be beneficial. If you have to interfere to hasten delivery, be sure that the patient is deeply anæsthetized, to save shock.

Cæsarean section, both abdominal and vaginal, has been advocated by some. Abdominal Cæsarean section is quite uncalled for, unless there is some other reason for doing the operation, such as a contracted pelvis. In a case in which delivery becomes necessary before the onset of labour, and the cervix is rigid, vaginal Cæsarean section would be quite justifiable, and probably the safest way of delivering the woman. Such cases are rare, unless one goes on the principle that every case should be delivered as quickly as possible after the fits have commenced. I do not believe in this principle.

In cases of post-partum eclampsia the treatment is the same, and bleeding² may be used, if the pulse is full and of high tension.

During the puerperium, the greatest care must be

taken to prevent sepsis. There is considerable risk of heart failure, and if the pulse is weak, free stimulation must be resorted to. Chest complications are very liable to arise, as the lungs are nearly always more or less œdematous. While the patient is comatose, she should be placed on her side with her head low, so as to allow the mucus to flow from her mouth. Dry cupping over the base of the lungs is very useful when there is much œdema. In all cases, it is well to have the chest encased in a gamgee jacket, to prevent chilling. Bronchitis, pneumonia, or pleurisy may come on, and they should be treated on ordinary lines. Insanity arises in a certain number of cases, and it must be watched for. The patients usually recover from it, but they must be carefully treated, and guarded from doing injury to themselves or their infants. In a few cases, hæmorrhages occur into the brain, usually with fatal result. They are probably the result of the fits. I have already spoken of hæmorrhages into the liver. They are generally small and numerous, but occasionally a very large one is found. I am inclined to believe that, when hæmorrhages into the liver occur, the case is likely to prove fatal.

If the child takes fits, it should be given small doses of chloral and bromide. If it survives, it should not be allowed to suckle its mother.

CHAPTER XVII.

RUPTURE OF THE VAGINA AND UTERUS.

Rupture of the Vagina.—When the vagina is ruptured, the tear may extend into the peritoneal cavity, the bladder, the rectum, or the surrounding areolar tissue. In the majority of cases in which the peritoneal cavity is opened into, there will be a rupture of the uterus as well, the tear having extended from the cervix into the vagina. Rupture may occur before the birth of the child, but it is generally brought about during delivery. Rupture of the vagina alone into the peritoneal cavity may, however, happen in obstructed labours by the tension on the wall becoming so great that it gives way in transverse presentations or in cases of pendulous abdomen, especially in contracted pelves. In a few rare cases, an obstructing tumour—an ovarian dermoid—has been forced through the posterior fornix. During delivery, rupture has been caused by instruments being pushed through the fornix in doing a craniotomy, or even in applying forceps. I have seen a case where the left blade of the forceps had been pushed through the left lateral fornix. In procuring abortions, instruments have been pushed into the peritoneal cavity.

Rupture into the bladder or rectum may be caused by the injudicious use of the perforator, or by a spicule of bone during the delivery of a crushed head. During delivery with forceps, a tear into the bladder or into the

rectum may be caused. It is rare for the bladder to be opened into in this way, but I have seen a case where a very broad occiput stretched the anterior vaginal wall so much, that a split occurred into the base of the bladder. The rectum is opened into, every time that there is a complete tear of the perineum.

During delivery, the vagina is very frequently torn into the areolar tissue by the side of the rectum, and less frequently in front by the side of the bladder. I have seen a tear in the latter position, which was so extensive that a great part of the bladder was exposed, and it bulged into the vagina. The accident happened during the delivery of an after-coming head in a primiparæ, but how it had come about the attendant was unable to explain. A large flap of the anterior vaginal wall hung loose. I stitched it up, and the healing was so perfect that it was almost impossible to trace the scar.

The dangerous cases are those in which the tear extends into the peritoneal cavity. The small intestine is liable to prolapse into the vagina, and it may be injured during delivery by tearing or bruising, or the omentum may be torn and the blood supply be interfered with. If the patient survives, sloughing of the bowel is apt to occur, and a fæcal fistula to form. The prolapsed bowel is also apt to become septic, and fatal peritonitis may be set up. In more than one instance, the prolapsed bowel has been mistaken for the umbilical cord, and it has actually been drawn down and a portion cut off. As a rule, bleeding from a vaginal tear is not very profuse, unless the cervix is also torn and the uterine artery divided, but, in that case, the bleeding is not from the vagina, but from the uterus. However, there may be severe bleeding, if the veins

about the vagina are varicose. Considering the copious venous supply, it is surprising how little bleeding there generally is from a vaginal tear, but this is no doubt due to the great pressure the veins are subjected to during delivery. The pressure closes the veins. A wound in the vagina during pregnancy may cause most alarming hæmorrhage, while a much more extensive wound caused during delivery may have very little bleeding from it. The reason of this is, that, in the latter, the veins have been closed by severe pressure, while, in the former, no pressure has been exerted upon them. If the tear extends into the vestibule and opens the veins about the clitoris, there may be profuse bleeding, because these veins are not subjected to the same amount of pressure as those in the vagina during delivery.

Diagnosis of Rupture of the Vagina.—When it occurs before delivery, there will probably be considerable hæmorrhage and collapse, but these features may not be marked. A careful examination will reveal the rent. When it occurs during delivery, an examination will reveal the tear. The less handling of the parts the better.

Prognosis.—When the peritoneal cavity is opened into, the condition is a grave one, but if proper aseptic precautions have been taken, and there is no injury to the bowel, the chances for the patient's recovery are very good. With ordinary tears which occur during delivery, there is very little risk, except from septic absorption.

Treatment.—When the rupture occurs before the child is born, in order to prevent further tearing, the delivery must be effected in whichever way will put the least strain upon the parts. If the bowel is down, it should be carefully cleansed, and then returned into

the abdomen above the brim, provided it has not been torn. After delivery the parts should be thoroughly cleansed, and the rent plugged with iodoform gauze. If there is much bleeding, the torn vessels should be secured, but, if there is general oozing, a firm plug will be sufficient. Stitching is not advisable. You must provide for free drainage, and the plug secures this. The patient should lie with her shoulders raised. The plug should not be left in longer than forty-eight hours, when it should be renewed.

If the labour has been conducted aseptically, and the intestines have not been prolapsed, there should be little risk of the peritoneal cavity becoming infected ; but if you have reason to suppose infection has occurred, do an abdominal section and cleanse the cavity as thoroughly as possible, and make provisions for very thorough drainage through the vagina. Keep the patient with her shoulders raised. If the bowel has been torn, an immediate resection should be done, provided the patient's condition will warrant this ; if not, the injured portion should be secured in the wound to allow a fistula to form. If the patient recovers, the fistula can be closed subsequently.

When the tear is formed during labour, the same treatment should be adopted, if the peritoneal cavity is opened into. Ordinary tears should be stitched with catgut, and if the rectum or bladder is opened into, immediate repair should be effected. In posterior tears the perineum should also be repaired. Catgut is the best suture to use in the vagina, and silkworm gut for the perineum.

Rupture of the Perineum.—As a rule, rupture of the perineum occurs during the passage of the child through the vagina, but I have seen many cases of rupture before the birth of the child, caused by attempts at delivery.

In some of these, the tear has been complete. The conditions under which tears of the perineum occur have been dealt with, and need not be further referred to. It is an accident which may occur even in the most skilful hands, but in many cases it is caused by the want of care. Delivery should be effected very slowly, and with the head as much flexed as possible. Lateral incisions I do not recommend.

Treatment.—In every case in which the perineal body is torn, no matter how slightly, the tear should be stitched. This will lessen the risk of septic absorption during the puerperium, and will also ensure a perfect repair of the parts. An open wound is always a source of danger. Any tear in the vagina should first be closed with catgut, and in slight perineal tears the same suture may be used in the perineum, but with moderate and severe tears, silkworm gut should be used for the perineum.

The patient should lie in the lithotomy position in a good light, so that you can expose the wound completely. The operation should be done with the strictest aseptic precautions. Cleanse the parts thoroughly by douching and swabbing, and if there are any tags of tissue, cut them away. Different forms of special perineal needles are used, but ordinary fully curved, large needles, with a needle-holder, are quite as useful. First close the vaginal tear with catgut, and then pass the silkworm gut perineal sutures so as to include the full depth of the tear. Use as many as may be required, and tie them carefully. If the ends are left long, it facilitates their removal. They should be removed in seven or eight days, or earlier, if they are beginning to cut the tissues. If proper precautions are taken, and the parts are kept clean during the puerperium, healing should take place by first intention ; but if the

needles or sutures are not aseptic, such a result can hardly be expected. Failure is nearly always due to want of proper care.

When the tear is complete, the rectal wound must first be closed with catgut. The sutures may be tied in the rectum, but a better method is to pass them only through the submucous tissue and not quite into the bowel, and then tie them in the wound where they are buried. The vaginal tear is then closed with catgut, and finally the perineal sutures are passed deeply, using silkworm gut. The posterior suture should bring the ends of the sphincter together. With a complete tear there is more risk of the parts failing to heal, but if proper care is exercised, a good result should be obtained.

In cases of central tear of the perineum, the bridge of tissue in front should be divided before suturing.

Tears of the Cervix.—These have already been referred to. They are fairly common in artificial deliveries, but they also occur in natural deliveries, especially in precipitate labours. They generally heal up of themselves, but sometimes a large fissure of one or both sides of the cervix is left. As a rule, unless there is bleeding, cervical tears are not stitched, but they ought to be repaired immediately after delivery.

Draw the cervix down with forceps, and pull it towards the opposite side of the vagina, and the tear will come into view. You then pass your sutures by means of a fully curved needle on a needle-holder. Catgut, which will last for ten or twelve days, should be used. Three or four sutures are generally sufficient. If the other side is torn, treat it in the same way.

Rupture of the Uterus.—Rupture of the uterus may occur during pregnancy or labour. During pregnancy

it may be the result of an accident, as a crush, or it may occur spontaneously. In the latter case the uterine wall may be diseased, or the seat of a scar of a former rupture or Cæsarean section. During labour the rupture may occur spontaneously, without any obstruction to delivery, but, in most cases, it arises in obstructed labours, either from uterine action or injudicious attempts at delivery. Formerly, the use of ergot in the second stage of labour was a not infrequent cause of rupture. In my experience, the most frequent cause is an injudicious attempt to deliver, generally by version after failure with forceps.

Frequency of Occurrence.—Fortunately, it is a rare accident, as it only occurs about once in 4000 labours. Multiparæ are more prone to it than primiparæ.

Seat of Rupture.—In obstructed labours, the lower uterine segment is the usual seat of the rupture. One would naturally expect this, as the thinned-out lower uterine segment is very weak compared with the main body of the uterus, and, besides, it is the part against which the child is being forced. The rupture may be transverse or vertical, or a combination of the two. The tear usually extends downwards through the cervix into the vagina, or, more rarely, upwards into the body of the uterus. Primary rupture of the body or fundus is usually due to weakness of the uterine wall from disease, or the presence of a scar of a former rupture or Cæsarean section.

Varieties.—(1) Complete, where the tear involves the entire uterine wall right into the peritoneal cavity. (2) Incomplete, where the mucous and muscular layers alone are involved; where the peritoneal layer alone gives way; and, lastly, where the peritoneal and muscular layers are torn, but the mucous one remains

intact. It is difficult to understand how this latter one can occur, but such a case has been described.

Causes.—The commonest cause is excessive strain upon the thinned-out lower uterine segment. This



FIG. 60.—Rupture of the posterior wall of the uterus from pressure against the promontory.

may be due to obstruction from a contracted pelvis, a tumour blocking the passage, a transverse presentation, hydrocephalus or some other abnormality of the foetus, obliquity of the uterus, a rigid cervix, or impaction of

the anterior lip of the cervix. In some cases, compression of the uterine wall between the head and the promontory, or an exostosis of the brim, causes it. Malignant disease of the uterine wall, or the scar of a former rupture or Cæsarean section, will predispose to it, and in some cases, it is due to fatty degeneration of the muscle fibres, and especially a degeneration of, or a want of development of, elastic tissue in the wall. In these latter conditions, spontaneous rupture is liable to occur without any obstruction. In one of my cases of spontaneous rupture, the elastic tissue in the uterine wall was very poorly developed. The use of ergot in the second stage of labour has already been mentioned as a cause, but perhaps the most frequent cause is an injudicious attempt to deliver by version in impacted transverse cases, or after failure with forceps in vertex or face cases, when retraction has occurred, or by dragging an undiminished, after-coming, hydrocephalic head, or an ordinary-sized head, through a rigid, partly dilated cervix, either with forceps or by traction on the body. In these latter cases, the tear begins in the cervix and extends upwards into the lower uterine segment, and the vagina is also ruptured.

Symptoms.—When rupture occurs from uterine action, the pains usually become stronger and stronger, and at shorter intervals, until they are almost continuous, and then they suddenly cease, and the patient collapses. She may exclaim that she has felt something give way. In cases of obstruction, just before the rupture occurs, the uterus will be found to be very tense, and across the abdomen, near the umbilicus, a sulcus will be felt, running either transversely or more or less obliquely. It can usually be seen quite distinctly. The uterine wall below it will be tense, and thin, and tender to the touch. This sulcus indicates the presence of the re-

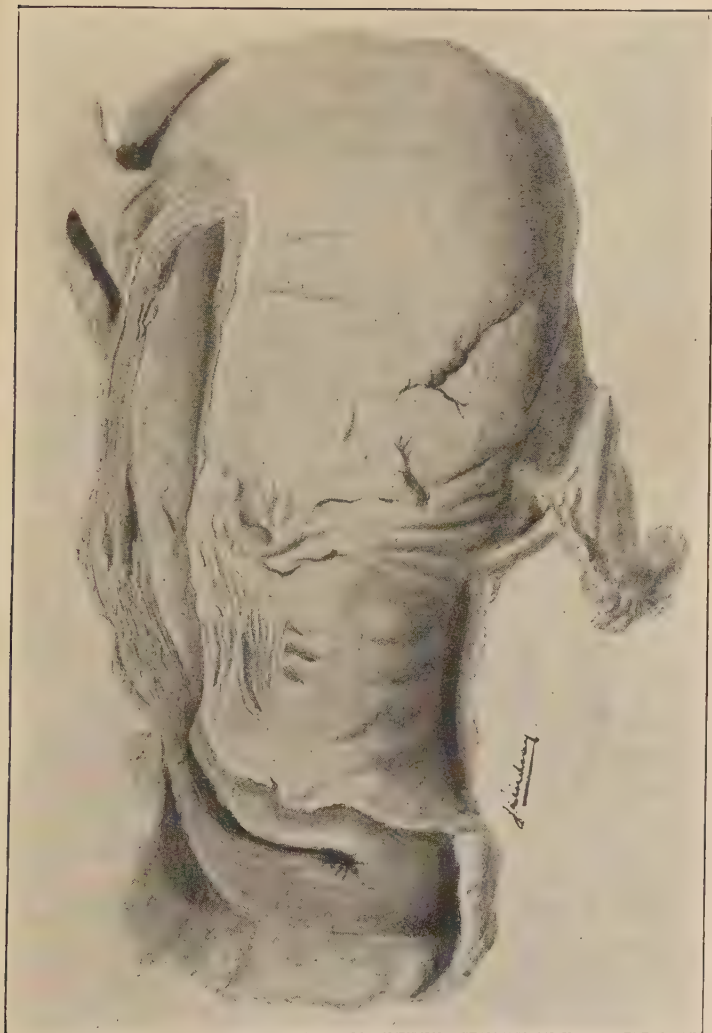


FIG. 61.—Spontaneous rupture of the uterus.

traction ring, and it is a danger signal which should never be disregarded. A distended bladder gives much the same appearance to the eye (Fig. 7), but to the touch the conditions are very different, as in the former condition you feel a fluid mass below the sulcus, while in the latter the thinned-out uterine wall will be felt, stretched over the presenting part. If there is any doubt, the passage of a catheter will at once settle the matter; for the swelling and sulcus will at once disappear with the withdrawal of the urine, if it be a distended bladder.

When the pains cease, there will probably be some bleeding from the vagina, and the patient's pulse will show profound collapse. The bleeding may not be great, and I have seen cases in which at first there were very few indications of collapse, but, as a rule, the collapse is marked, much greater than the amount of blood lost externally would indicate. The presenting part usually recedes, and if the child has escaped, partially or wholly, into the peritoneal cavity, you may be able to palpate two tumours through the abdominal wall. If only a partial rupture has occurred, palpation may not reveal much, but, if the blood has escaped beneath the peritoneum of the lower uterine segment towards the front, the sulcus will be made very apparent. This was very marked in the case from which the drawing for Fig. 52 was made.

In cases where rupture occurs during an attempt at delivery, there will be profound shock and hæmorrhage, and the practitioner ought to be able to recognize at once what has occurred. In cases of spontaneous rupture, where there is no obstruction, there is the same occurrence, but the knowledge that there is no obstruction may mislead you. You should bear in mind that, a sudden and complete cessation of pains, quickly

followed by collapse, can only mean rupture of the uterus.

Diagnosis.—The stoppage of the pains, the collapse, the hæmorrhage, and the recession of the presenting part plainly indicate rupture. Concealed accidental hæmorrhage will give the same profound shock, but it, of course, never occurs during the second stage of labour, and it causes distention of the uterus and continuous pain in the abdomen.

If the rupture is complete, and the child has escaped into the peritoneal cavity, palpation will generally reveal two tumours, and you will be able to make out the foetal parts with great distinctness, as they will be felt immediately under the abdominal wall. If the child lies in front of the uterus, you will not be able to feel two tumours, as the body of the uterus cannot be palpated. In an incomplete rupture, the presenting part will not have receded, and abdominal palpation will reveal that the child is still in the uterus, although the effused blood will have changed the shape of the uterus. There will not be two tumours in the abdomen. A vaginal examination will, at once, reveal the tear, if it extends into the vaginal vault, but, if it is in the body of the uterus, it will be necessary to pass the hand into the uterus, when the tear will be at once felt.

Prognosis.—The condition is an extremely serious one, especially when the rupture is complete. The patient may die of hæmorrhage and shock in a few minutes, or later from septic peritonitis.

Treatment.—Prophylactic treatment is of the utmost importance here. Spontaneous ruptures without any obstruction to delivery occur without any warning, so you cannot prevent them; but you should be able to prevent the accident in obstructed labours, provided you see the patient in time, and adopt proper means

of treatment. If your treatment is improper, you will probably precipitate matters. When speaking of the various forms of obstructed labour, I have dealt with the proper treatment to adopt, and shall merely recapitulate here.

In an obstructed labour, if the uterus is in a tonic state of contraction, and the retraction ring is apparent, *immediate delivery* is absolutely necessary. The patient should be at once put deeply under an anæsthetic. If the head presents, and the child is alive, and delivery by forceps possible, apply the instruments at once. Of course, the cervix must be fully dilated. If you fail to deliver, do not under any consideration attempt version, but do a craniotomy. If the child is dead, do a craniotomy at once. In a breech case, bring down a leg, and deliver by traction, and if the after-coming head is hydrocephalic or too big to come through, perforate it. In impacted transverse cases do not attempt to turn, but decapitate, or eviscerate, and cut the spine through, if necessary. In impacted face cases, if you fail with forceps, do not attempt version, but do a craniotomy. If the pelvis is badly contracted, and the child is alive, do a Cæsarean section, and if there is any risk of the uterus having been infected, remove it. If the child is dead, and the head presents, and there is room enough for the craniotomy instruments to be used, break the head up and deliver in that way.

In delivering a case where rupture is threatened, the mother alone must be considered, and the method of delivery must be adopted which will cause the least risk to her, no matter if it means sacrificing the child.

To prevent rupture from the cervix, upwards into the body of the uterus, during delivery by forceps, or during the passage of an after-coming head, always make sure

that there is sufficient dilatation of the os to allow the head to pass, without putting undue strain upon the cervix. Never hurry delivery where there is any risk of tearing the cervix.

Treatment when Rupture has occurred.—If the child and placenta are still in the abdomen, they must be extracted, and the uterus must be dealt with. The placenta is occasionally expelled before the child, and if you meet with a case in which the placenta is born before the child, always suspect rupture of the uterus, except with complete placenta prævia. The child and placenta may be delivered through the vagina, or through an abdominal incision. In an incomplete rupture, if delivery can possibly be effected through the vagina, it should be done, but, of course, if there is much obstruction, as from a tumour or a contracted pelvis, the abdominal route must be chosen. The child will be dead, and if you deliver through the vagina, there need be no hesitation in breaking it up to relieve strain on the parts. When the child is delivered, the placenta can easily be extracted, along with any clots in the uterus.

In a case of complete rupture, if the child has only been partly expelled into the peritoneal cavity, and the presenting part can be easily reached, and there is no obstruction, the child may be delivered through the vagina. If it has completely escaped into the peritoneal cavity, it will be much better to open the abdomen, and deliver, as in a Cæsarean section. In such a case, the probability is, that it will be necessary to open the abdomen to deal with the uterus, and if that is the case, there is no use in subjecting the patient to the additional risk of delivery through the vagina.

HOW TO DEAL WITH THE UTERUS.

In incomplete rupture, when the peritoneal layer is intact, thoroughly wash out the uterus and rent, using sterilized water or an antiseptic lotion. When the parts are as aseptic as they can be made, plug the rent and uterus with iodoform gauze. The plug may be left in for forty-eight hours, but not longer. It should then be removed, the parts douched, and a fresh plug inserted. The upper end of the bed should be raised, or the patient should lie with her shoulders raised, to ensure free drainage.

When the peritoneal layer is involved, either alone, or together with the muscular layer, there will be profuse internal hæmorrhage, and this can only be dealt with by opening the abdomen and either stitching or removing the uterus, as in a complete rupture.

In a complete rupture, if the child has been extracted through the vagina, the question comes to be whether the abdomen should be opened. If there has not been much bleeding, and the peritoneal cavity is not infected, washing out with sterilized water and then plugging with iodoform gauze, so as to prevent the bowels prolapsing, and to ensure good drainage, will probably give the best results. On the other hand, if the abdominal cavity contains a large amount of clot, and if the bleeding is continuing, abdominal section should be done at once. In such a case, and in those in which abdominal section has been done previous to delivery, how should the uterus be dealt with?

1. **By Suture.**—If the tear is clean-cut and in a position which can easily be reached, suturing may be done, but in most cases it is out of the question. The sutures should be the same as in Cæsarean section, deep and superficial. The superficial sutures

must be put in with great care, so as to bring the peritoneal edges well together, to prevent any discharge from the wound getting into the peritoneal cavity. While suturing, the patient may be placed in the Trendelenburg position, as this will give a clearer view of the parts.

2. **By Drainage.**—If suturing is impracticable, the wound may be treated by drainage, by means of a large rubber tube or a strip of iodoform gauze, the latter preferably. Generally speaking, the end should be drawn down into the vagina, but in some cases it may be better to bring it out at the lower end of the abdominal incision. The gauze may be left in for a week, if the parts remain sweet. Wherever it is possible, drainage should be employed, as it gives the best results.

3. **Removal of the Uterus.**—In some cases you may have to do this, as, for instance, when the rent is at the fundus, or is very extensive. An ordinary Porro's operation may be done, fastening the stump of the cervix in the lower edge of the wound, or the stump of the cervix may be covered with peritoneum and left in the pelvic floor, or you may do a complete extirpation.

In all cases, when the abdomen is opened, the peritoneal cavity should be cleansed of all clot and débris, if the patient's condition will allow of it, but if she is very much collapsed, and there has been no interference to cause septic infection, too much time should not be spent over the peritoneal toilet. Blood-clot, vernix caseosa, or liquor amnii will do no harm, provided they are aseptic. A large saline infusion should be given, and if the peritoneal cavity is closed, a quart or more of normal saline solution may be left in it. Free stimulation will be required. The subsequent treatment will be the same as after any abdominal section.

If the uterus is left, the question of sterilizing the patient is a very important one to consider. In most cases, I think, the tubes should be tied and cut to prevent future pregnancies, because rupture would be very likely to recur, if she should again become pregnant. If a woman has once come safely through such an ordeal, she should be saved from the risks of facing it again.

CHAPTER XVIII.

PROLAPSE OF THE CORD.

PROLAPSE of the cord is a complication which causes little risk to the mother, over and above what she runs from the abnormal presentation which generally is the cause of the prolapse. A prolapsed cord cannot obstruct the labour. It is too soft and compressible.

This accident is much more common in multiparæ than in primiparæ. The term "funic presentation" is sometimes applied to it when the cord is in front of the presenting part, before the membranes have ruptured, and "funic prolapse," if it descends after dilatation, when the membranes are ruptured. This is a useless distinction.

Frequency.—It occurs about once in 150 cases.

Causes.—It may occur in an ordinary vertex presentation, but it is much more common in malpresentations, and especially in contracted pelves. It is apt to arise when the membranes rupture, in any case in which the presenting part does not fully fill up the brim, especially if there is a fairly large quantity of liquor amnii present, as the rush of the waters may carry the cord down, if it is long enough. It is most frequent in transverse, and next in breech cases. Long cords are much more liable to be prolapsed than short ones; in fact, if the cord is very short, it is impossible for it to be prolapsed.

Diagnosis.—This can only be made by a vaginal examination, unless, of course, a loop can be seen protruding at the vulva. You cannot diagnose it by abdominal palpation. Before the membranes are ruptured, the cord can be felt inside them, and there should be no difficulty in recognizing it, especially if it is pulsating. When the membranes are ruptured, a finger can be hooked round a loop, and you can often draw it down into sight. A loop often protrudes at the vulva. Always note whether it is pulsating or not. Your attention must not be devoted entirely to the cord, but you must make out what other part of the child is presenting.

One would imagine that it would be impossible to mistake anything else for the cord, but such a mistake has been made. More than once a coil of the mother's small intestines, which had prolapsed through a rent of the vagina, has been mistaken for the cord, and, what is worse, the intestines have been drawn down, and several feet have been cut away. There is no excuse for such a mistake, but, unfortunately, it has happened. What security have we that it never can happen again?

Prognosis.—So far as the mother is concerned, there is little or no risk added to that which she already runs in the case of an abnormal presentation. With a normal vertex presentation, there is usually the added risk of a rapid artificial delivery in the interests of the child, but if the child is dead, there is no necessity for this proceeding. No matter how the child may present, there is always great risk to it. At least one-third of the children are lost from compression of the cord.

Treatment.—So far as the cord is concerned, the treatment will depend on whether or not the child is alive. If the child is dead, the fact that the cord is prolapsed will not in any way influence the treatment

of whatever other complications may be present. If the child is alive, an effort must be made to save its life, and to do this special steps will probably have to be taken, in addition to the usual treatment of the other condition present. The first point is to decide as to whether or not the child is alive. If the cord is flaccid and pulseless, the child is dead. To make absolutely sure that pulsation has ceased, examine between the pains. During a pain, the pulsations may cease from the pressure and yet the child be alive, but if there are no pulsations between the pains, you may be quite sure that the child is dead. If the child is dead, no treatment is necessary, so far as the cord is concerned, as it will not in any way obstruct the delivery. If the child is alive, you must take steps to have the cord placed so that it will escape pressure upon it during delivery, or, if you cannot do this, you must deliver in such a way and with such rapidity as to ensure that the pressure, to which the cord must necessarily be subjected, is not so great or so long protracted as to cause the death of the child.

In vertex presentations, if the membranes are unruptured and the cord is pulsating, try to replace the cord above the presenting part. Place the patient in the genu-pectoral or the Trendelenburg position, and by the action of gravity the cord may fall back into the uterine cavity. You may assist this by judicious pressure through the vagina, but be careful not to rupture the membranes. If the cord slips up into the uterus, push the head into the brim, allow the patient to assume the ordinary position again, and rupture the membranes, if the os is fully dilated, so as to ensure that the head will become fixed in the brim and prevent a subsequent prolapse. If the os is not fully dilated, put on a firm binder to keep the head fixed in the

brim. If the cord remains up, so far as it is concerned, the labour may be left to nature. If it does not pass up and it is not being pressed upon, wait until the membranes rupture. If it is being pressed upon, rupture the membranes at once, and treat it in the same way as you would a case which you see for the first time after the membranes have ruptured.

When the membranes have ruptured, and the cord is still pulsating, try to replace it by pushing it up with the fingers, or by means of a loop of aseptic string and a catheter, but, if it has been protruding at the vulva, be careful to cleanse it first, to prevent septic infection of the uterus. If it cannot be kept up, and it is being pressed upon, the only chance of saving the child is to deliver by version or forceps. If the os is not fully dilated, manual dilatation should be resorted to before version or the application of forceps, and in applying forceps, be careful to pass the blade between the cord and the head, so that the forceps will not compress the cord during delivery. The delivery must be more rapid than in an ordinary case, to lessen the time of pressure upon the cord as much as possible. In contracted pelves, especially those of the flattened type, by placing the cord at one or other side of the pelvis, the amount of pressure upon it will be minimized, but even in these cases delivery must be hastened, if the child's life is to be saved.

In cases where the os is only partially dilated and the membranes are ruptured, by inserting a Champetier de Ribes' bag you can keep the cord up and ensure dilatation; but if the liquor amnii has drained away, there is considerable risk of compression of the cord between the presenting part and the bag, especially in vertex presentations. In transverse presentations, the risk is not so great. If there is sufficient liquor amnii present, the

insertion of a bag is most useful. Dr. Stone, of Chicago, has devised what should be a useful modification of Vorhee's bag for treatment of cases where the liquor amnii has drained away. A tube passes through the centre of the bag, and when the bag is in the cervix and filled, warm normal saline solution is injected through this tube, into the uterine cavity, to take the place of the escaped liquor amnii. The cord is, of course, first replaced. About a pint of the solution is usually sufficient, but if the contractions become too severe some of the solution can be allowed to run out, and, on the other hand, if there is much leakage by the side of the bag, it will be necessary to inject more fluid. The labour is allowed to go on until the os is fully dilated, and then, if it is necessary, delivery is effected either by version or by forceps.

In cases of transverse presentations with prolapse of the cord, the fact that the cord is prolapsed will not influence the treatment to any extent, as version, as soon as the os is dilated, is the proper treatment for both conditions, when it can be done with safety to the mother. The only thing to be considered is that, if artificial dilatation is necessary, you should be sure that the method adopted will not cause pressure upon the cord.

CHAPTER XIX.

MULTIPLE PREGNANCY.

IN Britain the average of twins is 1 in 100 pregnancies, while in Ireland it is 1 in 60. They very frequently run in families, *i.e.* the tendency to twin-bearing is hereditary. This hereditary influence may operate through the father as well as the mother, as the same man may be the father of twins by different women, and brothers have frequently been fathers of twins by women in no way related. They are commonest in first pregnancies, especially in elderly women. Imbeciles, idiots, and children with bodily deformities, are common in twin-bearing families.

Varieties.—Each child may be developed from a separate ovum (*binovular*), or both may come from one ovum (*uniovular*). In the first the sexes may differ, but in the second they will be the same.

Binovular Twins.—The two ova may come from one ovary, or one from each ovary. When they are from one ovary, they may be from separate ovisacs, when there will be two corpora lutea, or from one ovisac, when there will be one corpus luteum. When one comes from each ovary, there will be a corpus luteum in each ovary.

Fertilization of the two ova may take place at one insemination, or at two different inseminations within a short time of each other. This latter fact has been

proved by the birth of a white and a black twin, where the two ova have been impregnated by a white and a black man respectively. This condition is known as **superfecundation**. We have no means of judging of the frequency of its occurrence. An analogous condition of so-called **superfoetation** is said to occur at times, by the impregnation of a second ovum some months later than the first. The birth of a mature and an apparently premature child at one time, or the birth of two children within a month or two of each other, has been held as proving that this condition can exist, but until the possibility of the existence of a double uterus in such cases has been disproved, I cannot admit that superfoetation can take place in a single uterus. In some of the supposed cases, a double uterus has been found. Each half of the uterus has become impregnated at different times, which may easily happen, as ovulation continues during pregnancy. Besides the condition of two ova developing, one in each side of a double uterus, two have been found, one in the uterus and one in a Fallopian tube, two in one Fallopian tube, and one in each Fallopian tube.

Arrangement of the Deciduae and Membranes in Binovular Twins.—At first the decidua reflexa may be double, but at the end of pregnancy this cannot be made out. Each ovum has at first a complete and separate chorion, and these may remain separate to the end of pregnancy, but the portions which lie together may fuse and disappear, so that at full time there is apparently a single chorion. Each foetus has, of course, its own amnion, and the two sacs remain separate throughout, except in extremely rare cases, where they may fuse, and then there will be one common sac at the end of pregnancy, as in uniovular twins. At full time there may be two distinct bags of membranes, and

the placentæ be quite separate. There may be a single chorion, but the amniotic sacs will be separate, except in very rare instances. The contiguous edges of the



FIG. 62.—A double monster.

placentæ may be apparently united, but there will be no communication between the vessels.

Binovular twins are much more common than uniovular, and are more frequent in multiparæ than in

primiparæ. As already stated, they may be of the same, but more frequently of different sexes.

Uniovular Twins are developed from a single ovum, which may have two blastoderms, or a single blastoderm which divides into two portions. Each blastoderm, or division, develops into a fœtus, and the sex is always the same. If complete division of the blastoderm does not occur, a double monster results.

Arrangement of the Decidua and Membranes in Uniovular Twins.—There will be a single reflexa and chorion, and in some cases a single amnion, or each fœtus may have its own amnion. In the majority of cases, there are two amnions. The placenta is single, with, as a rule, two separate cords, but they may be united before they are inserted into the placenta. There is always a communication between the two foetal circulations.

Uniovular twins perish prematurely much more frequently than binovular, and abnormalities are more common. When one embryo is less developed than the other, the heart of the stronger may force the blood up the umbilical arteries of the weaker, and so disturb the circulation of the weaker as to cause atrophy of its heart, and an **acardiac monster**, as the result. The lower parts of the monster develop, as they are well supplied by blood forced along the umbilical arteries; but the heart and upper parts not being sufficiently nourished, cease to develop, and either disappear, or only remain as a mass of undifferentiated tissue. The lower limbs are more or less normally developed, but the upper limbs and head are entirely wanting. The stronger embryo may have some abnormality as well, such as an encephalocele.

Course of the Pregnancy in Twins.—In more than half the cases, premature labour occurs. One fœtus

may die and be expelled, while the other remains *in utero* until full time, but more frequently the dead foetus is retained. When one foetus has perished, the pressure of the growing one may flatten out the dead one against the membranes and convert it into a **papyraceous foetus**. Hydramnios is common with twins, and it may affect one or both. Vesicular degeneration of the chorion may also be present, giving rise to a so-called hydatid mole in connection with one of the twins. When the twins are in one sac, the cords may become so twisted and knotted together as to cause the death of both foetuses (Fig. 63). Albuminuria is very common, and œdema of the vulva and legs may become extreme, largely from the pressure. Eclampsia is more common with twins than with single pregnancies, and one would expect this to be the case, if the cause of eclampsia originates in the waste products of metabolism, as these must be much greater with twins. Placenta prævia is said to be very uncommon with twins, but with this I cannot agree. The large size of the placenta predisposes to the attachment of a portion of it below the retraction ring, but, fortunately, in the majority of the cases, it is only a small portion which is below the ring.

Presentation.—In nearly half the cases, both heads present, and in about a third, a head and a breech; then come both breeches, head and transverse, breech and transverse, and, least frequently, both transverse. .

Triplets are exceedingly rare, perhaps once in 10,000 cases; while quadruplets are much rarer. Quintuplets have been recorded, but there are no authentic cases of more than five. Triplets may arise from separate ova, or from two ova, two from one and the other single. The membranes and placenta will be arranged

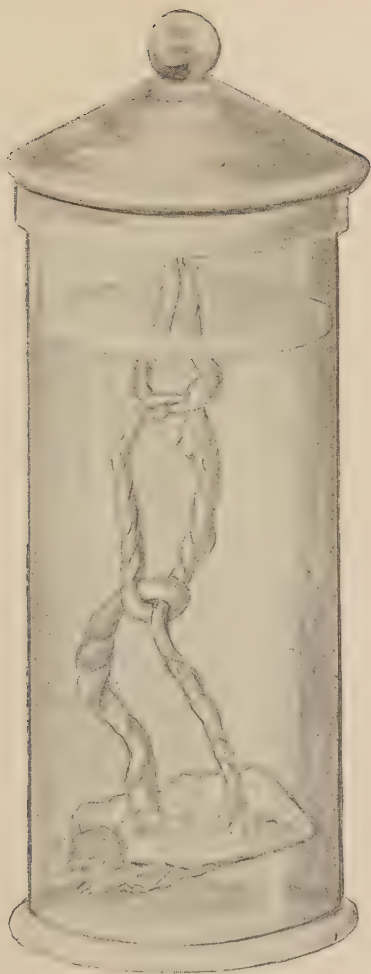


FIG. 63.—Knotted cords which caused the death of the twins.

according to the ova. The children may all be of one sex.

Premature labour is almost sure to occur, and the risk to both mother and children is greater than with twins.

Diagnosis.—On inspecting the abdomen, the uterine tumour will be found to be larger and broader than usual, and sometimes a groove can be noticed. By palpation you may be able to make out two heads and more limbs than in an ordinary case. If, on auscultating the abdomen, you can make out two foetal hearts, with separate points of maximum intensity, and a difference in rates, you may be absolutely sure of the diagnosis. If, however, one child lies directly behind the other, and there is a considerable amount of liquor amnii, you will not be able to palpate the posterior child, nor can you hear its foetal heart. As a matter of fact, the diagnosis of twins is most frequently made after the birth of the first child. This is often due to the want of care in examination of the patient, but in some cases the most careful examination may fail to reveal the presence of two children, if one lies directly in front of the other, or if there is hydramnios in one or both sacs. In such cases, the presence of twins should be suspected, but the absolute diagnosis can only be made after the first child is born. If the placenta of the first child comes away in the usual time, the second child may be retained *in utero*, to be expelled a few hours or days later. When this occurs, a mistake may be made, but there is no excuse for such a mistake on the part of a medical attendant. I have known it to occur twice on the part of so-called midwives. In one of these cases, the patient, who had previously given birth to twins, was quite sure that there was a second child, but the midwife insisted there was

not, and put on a binder and left. A few hours later I was called, and found the second child born.

Prognosis.—The risk to the mother is considerably greater than in single pregnancies. During pregnancy a greater strain is thrown upon the kidneys, albuminuria is apt to occur, and eclampsia to result. Premature labour is frequent, and when it occurs, the risk to the children is much greater than at full time, and to the mother also there is a slight increase of risk. During labour the over-distended condition of the uterus is apt to cause delay from uterine inertia, and if the inertia is continued into the third stage of labour, there is very great risk of post-partum hæmorrhage. The enlarged placental area also adds to the risk of post-partum hæmorrhage. If there is hydramnios, the risk from post-partum hæmorrhage is specially great. Even in cases in which there is no uterine inertia, the enlarged placental area will give rise to more hæmorrhage than in an ordinary single birth. Artificial delivery in the interests of the children may also add to the risk to the mother. In regard to the children, the prognosis is not nearly so good as in single births. If there is much delay between the births, the risk to the second child is materially increased, therefore one should take steps to hasten the delivery of the second child, if it is not expelled by uterine effort within an hour of the birth of the first.

Treatment.—If the uterus is much over-distended, the first stage of labour is liable to be prolonged from primary uterine inertia. In such cases, the membranes should be ruptured early. If two bags present, one containing a head and the other a breech, the one containing the head should always be ruptured first, to allow the head to descend and prevent locking. As a rule, the second stage of labour will not be very long,

as the children will be small. This does not hold good when there is obstruction, as from locking. When the first child is born, the cord must be tied in two places, so as to prevent bleeding from the end next the mother. There may be a single placenta, and, in that case, if the cord is not tied, the second child will quickly bleed to death. The uterus usually remains quiescent for half an hour or so before contractions set in again. If



FIG. 64.—Twin pregnancy : Head and breech presentation. (Playfair.)

the second child presents either by the head or breech, rupture the membranes, if necessary, and wait for half an hour, massaging the uterus to stimulate contractions. If the second child is transverse, do not wait, but turn it at once, before the uterus retracts round it. If uterine contractions do not begin within an hour of the birth of the first child, you may wait for the contractions to come on again, but in the interest of the child this is not advisable. When there is a delay of

more than an hour between the birth of the children, the risk of the second child being stillborn is much increased. You should therefore deliver the second child by forceps or version within an hour of the birth of the first. As the second child is being delivered, the uterus should be carefully followed down with the hand on the abdomen, and the greatest care taken to prevent post-partum hæmorrhage. In these cases, the third stage of labour must be carefully conducted, as there is great danger of post-partum hæmorrhage from inertia of the uterus, and also from the enlarged placental area. Ergot should be given hypodermically, as soon as the uterus is completely emptied, and active compression should be kept up, until the uterus is thoroughly retracted. An intra-uterine douche (120° F.) may be necessary to ensure good retraction. There may be one large placenta, or two smaller ones. If there are two which are quite separate, the placenta of the first child may come away before the second child is born, but, as a rule, both placentæ are retained until the second child is born. Rarely, both placentæ are expelled before the second child is born, and in such a case, the second child will be dead.

Malpresentations are common with twins. One or both may show this. They must be dealt with as in single births, only care must be taken not to cause locking; for instance, if you should meet with a head and a transverse case, the child which presents by the head should, if possible, be delivered first, for, if you turn the child which presents transversely, the heads will very probably become locked, and you will then have to sacrifice the child you have turned; whereas, if you are able to deliver the one which presents by the head, first, then there should be no difficulty in delivering the second child by version, and you may thus be

able to save both. The malpresentation is most frequent in the second child, and as the parts are well dilated it easily can be dealt with. It should be dealt with at once.

Locked Twins.—Locking can occur in several ways, either with both heads presenting (Fig. 65), a breech and a head (Fig. 66), a breech and a transverse, or a head and a transverse. The first two are the more



FIG. 65.—Locked twins, both heads presenting. (After Barnes.)

frequent, and they can hardly be avoided ; but, in the case of the others, they can be avoided, if the cases are seen in time, and proper methods of delivery are adopted. As a matter of fact, locked twins are exceedingly rare. I have only once seen a case, and the children were so premature that they were expelled with the heads locked, the first child being born by the breech. They were both alive, but too premature to survive.

When both heads present, the locking arises when

the first head enters the brim, and the second one follows along with the chest of the first child. If there is not room for the head of the second child to pass through the brim along with the chest of the first child, jamming takes place. If the children are small, they may pass through, and delivery be effected by natural efforts, but, as a rule, assistance will be required. The first child may be delivered by forceps, but considerable force will be required. Try to push the head of the second child out of the way before making traction. If you cannot effect delivery in this way, one of the children must be sacrificed, and as the first one will probably have suffered from the traction, the second one will be the more likely to survive; therefore break up the head of the first one, and remove it entirely, if possible, and deliver the second child with forceps.

Breech and Head.—The first child comes by the breech, and when its body is born, the after-coming head becomes locked with the presenting head of the second child. The heads may lock chin to chin (Fig. 66), chin in the nape of the neck, occiput in the nape of the neck, or head against the side of the neck. If the children are small, the heads may come through the pelvis locked together, but this can only happen with premature children. If the children are full-sized, there is not room in the pelvis for the passage of the locked heads, and unless the heads can be unlocked, one of them is doomed.

If the case is seen before the membranes have ruptured, the bag containing the head should be ruptured, to allow the head to descend first and prevent locking. If the locking has occurred, and the uterine contractions are not very strong, you may be able to unlock the children by pushing up the partly born child, and then push-

ing the head of the second one out of the way. If you cannot do that, decapitate the first child by cutting through its neck with scissors or a knife, and push the head back, and apply forceps to the head of the second

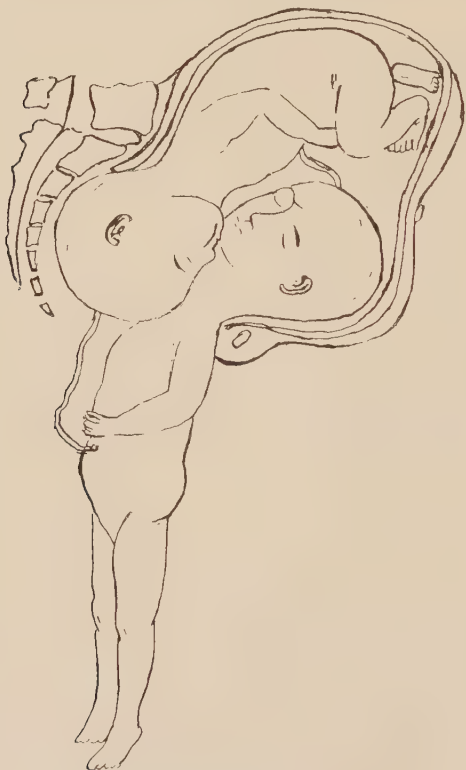


FIG. 66.—Locked twins : Breech and head presentation. (After Barnes.)

child and deliver it. The severed head must then be delivered by forceps, crotchet, or cephalotribe, in the same way as in a case of decapitation in a transverse case. You need have no compunction in severing the

neck of the first child, as it will probably be dead from compression of the cord, and, at all events, it cannot be saved.

Breech and Transverse.—If seen early, turn the transverse, and thus prevent impaction. If impaction has occurred, press aside the transverse child, so as to unlock the head, and then deliver the first child by traction, and turn and deliver the second. If you cannot do this, decapitate the first, and turn and deliver the second one, and then deal with the severed head in the usual way.

Head and Transverse.—Push the transverse one out of the way, and deliver the first one with forceps ; then turn the second, and deliver it. In dealing with a case of this kind, before impaction, it will manifestly not do to turn the transverse one and attempt to deliver it first, as the heads may easily lock. If you could not get the forceps on to the head of the first child, you might turn it, if the uterus would allow of this.

In doing version on the first child, in twin cases, one must always bear in mind the possibility of the after-coming head being locked, and take steps to prevent this.

CHAPTER XX.

OBSTETRIC OPERATIONS.

Preparation of the Patient for Delivery through the Natural Passages.—In all cases, the bowels should be thoroughly cleared and the bladder emptied. The external genitals should be cleansed by washing very thoroughly with soap and water and an antiseptic solution, such as lysol. In hospital patients, shaving of the parts in the more serious operations is advisable, but in private work it is undesirable ; if the hair is long, however, it should be clipped short. In forceps cases, douching of the vagina before applying the instruments is not necessary, unless the vagina is in an unhealthy condition ; but in versions, inductions, operations on the cervix, and destructive operations, the vagina should be very thoroughly douched out. Lysol solution is one of the best to use, and, while douching, the whole of the vaginal wall should be well scrubbed with pledgets of sterilized wool. An antiseptic soap may be used for this, but the lysol solution does quite as well as any soap. Mercurial douches are not to be used, as the effect on the vaginal mucous membrane is an astringent one, and difficulty will be experienced in passing the hand, after the douche is given. While every effort is made to make the external genitals and the vaginal canal as aseptic as possible, the operator must see that his hands, arms, and instruments are also in that con-

dition. An obstetric operation should be undertaken with just as much care as a gynæcological or surgical one, and if this were realized and acted up to, there would be few cases of septicæmia after delivery.

Anæsthesia.—As a rule, an anæsthetic should be administered, though many of the operations can be performed without it. It saves suffering, and allows greater freedom of action, without any additional risk, therefore it should be used. In many cases deep anæsthesia is not required, but where relaxation of the uterus is necessary, the patient should be put deeply under. Chloroform is almost universally used in Scotland, and it is the handiest, as it can be given so easily. Even in bad cardiac cases it is not contra-indicated. It increases the tendency to post-partum hæmorrhage, but not so much as ether does. This danger can be easily guarded against by grasping the uterus and massaging it after the child is born, so as to induce firm contraction and retraction.

Spinal Anæsthesia.—For a number of years this form of anæsthesia has been in use in general surgery, but it has not been used much in obstetrics in this country, at least. One cubic centimetre of a 2 per cent sterilized solution of hydrochlorate of cocaine ($\frac{1}{2}$ grain) is slowly injected into the sub-arachnoid space through a long hollow needle thrust in between the fourth and fifth lumbar vertebræ. The strictest aseptic precautions must be observed, and when the needle is withdrawn the puncture should be sealed with collodion.

The analgesia commences almost immediately, and will usually be complete in from five to ten minutes, but it may be delayed longer than this. It is usually complete from the diaphragm downwards, but in some cases it extends even as high as the upper extremities. The duration is somewhat variable, but it usually lasts

for about an hour ; it may only last for thirty minutes, or be prolonged for three and a half hours.

Within a few minutes of the injection the patient experiences a feeling of malaise, with some respiratory anxiety, and in ten or fifteen minutes nausea and vomiting often occur. The pulse is slightly quickened and the tension lowered. If too large a dose be given, respiration will be affected, and danger may arise from this cause. Six or eight hours after the injection severe headache is generally felt, and it may be overpowering and last for several days. The risk to life is said to be very slight, but deaths have occurred. For prolonged operations it is not suitable, but Cæsarean sections have been done under it. For forceps operations it is suitable enough, but in obstructed labours, especially where version is required, its use is decidedly contra-indicated, because it causes powerful contractions of the uterus. On account of the action upon the uterine muscular fibres, Doléris has recommended its use in the induction of labour.

Scopolamine-Morphine Narcosis.—Hypodermic injection of small doses of these two drugs in combination have recently come into vogue. The effect is to lessen, and in some cases to entirely abolish, the suffering, while the uterine contractions are not interfered with. Morphia alone will interfere with the contractions, but in combination with scopolamine it does not seem to do so to any appreciable extent ; neither does it affect the respiratory centre. The soporific effect is usually marked, the patient, as a rule, sleeping between the pains, and only rousing during the acme of the pains. Discomfort, and not actual pain, is the usual complaint. After labour, the sleep usually lasts for two or three hours, and occasionally the patient has no recollection of her labour.

The injection may be given during the first stage of labour, and in some cases it seems to hasten the dilatation of the os. As the effect only lasts for about two hours, it may be necessary to repeat the injection. In the second dose the scopolamine may be used alone. If it is not used until the second stage, one injection may be sufficient. Forceps may be applied without giving chloroform, but chloroform can be administered with safety. A safe dose to use is $\frac{1}{200}$ th grain of scopolamine plus $\frac{1}{6}$ th of a grain of morphine. If a second dose is necessary, $\frac{1}{200}$ th grain of scopolamine without the morphine will probably be sufficient. Scopolamine in solution does not keep well. The tabloid form is best to use, or preparations in sealed tubes.

The mothers do not suffer from any bad effects of the drug, but the children are occasionally born narcotized, and artificial respiration will be necessary. The duration of labour does not seem to be influenced to any great extent.

This form of narcosis is of little or no use for operative purposes, but it is convenient to consider it here.

Artificial Dilatation of the Cervix.—This operation has been repeatedly referred to in dealing with the different forms of labour, and I shall now describe the various methods of performing it.

To procure dilatation, nature employs a fluid bag, which is forced downwards by the uterine contractions. This is a slow method, but it is sure, provided that the uterine contractions are strong. When it fails, we can imitate the natural process by the introduction of hydrostatic bags. Of these, various kinds are in use, such as the rubber bags of Barnes, and the more rigid and larger bag of Champetier de Ribes.

The rubber bags are too soft and are liable to balloon out, and they may be expelled without having caused

much dilatation. The larger and more rigid bags, which should be made of silk, are more useful as dilators. A certain amount of traction can be made upon them. A drawback to their use is that the presenting part is very liable to be displaced. In most cases, however, this is of very little importance. As a rule, the membranes should be ruptured before the introduction of one of these large bags, otherwise the intra-uterine pressure may be increased to a dangerous extent. These bags are particularly useful when the membranes have ruptured early, more especially when there is an abnormal presentation, such as a transverse one. By their means complete draining away of the liquor amnii is prevented, and the child is thus saved from injurious pressure during the time of dilatation. I need not dwell upon the importance of preventing the retraction of the uterus round the child in transverse presentations, or, indeed, in any case where version is necessary. In cases of placenta prævia the large bags are most useful, as the pressure is exerted against the bleeding sinuses.

Method of introducing Barnes' Bags.—To introduce even the smallest of the set of bags, the cervical canal must be dilated sufficiently to admit one finger. As a rule, you can dilate the canal sufficiently with your forefinger, but if you fail, use Hegar's metal dilators. In many cases the canal will be sufficiently dilated. An anæsthetic is not necessary for the introduction of the bag, but it renders the operation much easier.

In the usual form of Barnes' bags there is a small pouch, into which a sound is passed for the purpose of introducing the bag. I remember once trying to introduce one in this way, and I only managed to push the sound through the bottom of the pouch. A bag with a pouch on it should never be used, as the pouch cannot

be properly cleaned, and septic material may be introduced in it. The easiest way to introduce the bag is by using a pair of forceps similar to, but smaller than, those used for the introduction of Champetier de Ribes' bag. The bag is folded into as small bulk as possible, and grasped with the forceps, and introduced into the cervix. The forceps are then unlocked and withdrawn, and the bag is filled with fluid by means of a Higgenson's syringe. When it is full, the narrow waist of it should lie in the cervix, and the wider ends should be one inside the internal os and the other in the vagina. It sometimes slips into the uterus while it is being filled, and if this occurs, some of the fluid must be run out to allow of the bag being pulled down into the cervix. You should know how much fluid to pump in to fill the bag, because if you force in more than it can hold, you will either burst it, or cause it to balloon out into the uterus. The tube connected with the bag should be wrapped in iodoform gauze, to prevent it becoming soiled. Before insertion the bag should have been sterilized by soaking it for several hours in an antiseptic solution.

The pressure of the full bag soon sets up uterine contractions, and in a few hours it will be expelled into the vagina, when it should be removed. If further dilatation is necessary, a Champetier de Ribes' bag can now be used, or manual dilatation.

Use of Champetier de Ribes' Bag.—Champetier de Ribes' bag (Fig. 67) is much larger and firmer. It should be sterilized by soaking in an antiseptic fluid. For its introduction the os must be wide enough to admit two fingers, so, in many cases, a preliminary dilatation with Hegar's dilators will be necessary. The bag is folded into as small a space as possible and introduced by means of the forceps made for the purpose (Fig. 68). It is generally advisable to rupture the mem-

branes just before the introduction, because the bag is so large that, when it is filled, it will increase the intra-uterine pressure considerably. When it is filled with fluid, it occupies the lower part of the uterine cavity, and displaces the presenting part. This is sometimes a disadvantage, but if version is the method of delivery to be afterwards employed, as is generally the case, this does not matter. Uterine contractions generally come on very quickly, and as the bag is forced down dilatation is caused. To hasten dilatation, steady traction can be kept up by attaching a weight to the tube, and allowing it to hang over the end or side of the bed.

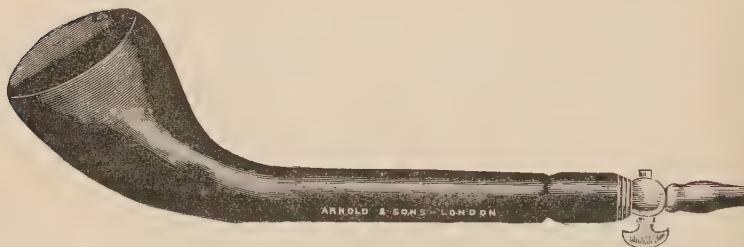


FIG. 67.—Champetier de Ribes' bag.

When the bag is expelled, there will be sufficient dilatation to allow of delivery by version or forceps.

This method of dilatation is most useful in cases of placenta prævia, as the pressure of the bag against the opened-up sinuses will completely control the bleeding.

The Use of the Vaginal Plug.—The vaginal plug is another method of dilatation. This is a slow method, but it is of use in certain cases—for example, *ante-partum* hæmorrhage—notably in cases of unavoidable hæmorrhage, where the os is not sufficiently opened to allow of the performance of bipolar version. If the plug is properly inserted, it will not only control the bleed-

ing, but it will stimulate the uterine contractions and ensure dilatation.

To properly plug the vagina, the patient should be given an anæsthetic. She should be placed in the lithotomy position, and a large speculum should be used to draw back the perineum. The best material to use is long strips of iodoform gauze. If there is any dilatation of the cervix, its canal should first be packed, and then the fornices and the whole of the vagina. It will be necessary to use a large amount of material, and to facilitate removal, the strips should be fastened together. Pledgets of sterilized wool may be used, but they should be fastened together like the tail of a kite.



FIG. 63.—Forceps for introducing Champetier de Ribes' bag.

The plug, if it is an antiseptic one, may be left in for twenty-four hours, but, in most cases, it will not be necessary to leave it more than ten or twelve hours. Occasionally, it may be necessary to repeat the plugging, but, if possible, this should be avoided, as the pressure against the vaginal wall may injure the mucous membrane, and this will increase the risk of septic absorption after delivery.

Some authorities condemn the use of the plug, and it certainly is useless if it is not properly applied ; but when it is properly applied, it is a most useful method of treatment, especially in cases of unavoidable hæmorrhage, as it controls the bleeding and stimulates uterine contractions, and gradual dilatation is brought about.

The Use of Tents.—Sterile tents can now be obtained, and they are most useful for causing dilatation up to about the sixth month of pregnancy, and they may

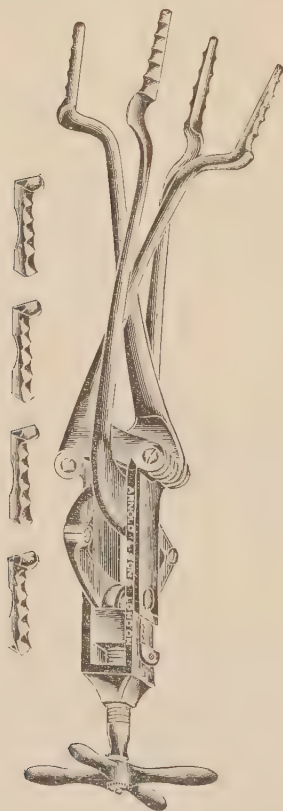


FIG. 69.—Bossi's Dilator.

even be used towards full time. I have found them most useful at the fourth or fifth month of pregnancy, when it was necessary to clear out the uterus. One or more are inserted into the cervical canal, and the

vagina is then plugged lightly with iodoform gauze, to keep them in position. The expansion of the tent gradually stretches the cervix and sets up uterine contractions, and by next day there will be sufficient dilatation to allow of the clearing out of the uterus.

The bags and the vaginal plug act chiefly by stimulating uterine contractions. The other methods of dilatation, which I am about to describe, are more rapid, and are directly applied to opening up the canal, either by forcible stretching, or by incision, without bringing into play the uterine action. In these methods, especially where incisions are employed, we are departing from nature's ways—a proceeding never to be undertaken rashly.

Manual Dilatation.—This is a very old method, and one which has probably been in use ever since accoucheurs began their work. It consists in the passing of one finger through the os, then two fingers, or one finger and a thumb, and so on until the four fingers and thumb are within the os. Then, by the gradual opening of the hand, the cervix is stretched, until complete dilatation is obtained. It is a very effectual method when the cervix is soft and yielding, but if the cervix is rigid, the hand quickly becomes cramped and almost paralysed, and, in cases of great rigidity, one may fail entirely. If a hot lysol douche be allowed to play on the cervix during the operation, it softens the tissues and materially assists the process. The douche also lessens the risk of septic infection. Manual dilatation is most useful, when the cervix is taken up and the os is slightly open. Whenever it becomes necessary to deliver before the os is fully dilated, this method of dilatation is the one most usually adopted. If the hand is rendered aseptic, as it should be in midwifery work, it makes a very perfect instrument, and one which

possesses this advantage over metal instruments, that it lets you know at once if the parts are tearing, instead of stretching.

Bi-manual Method.—When the cervix can be brought low enough to hook one or two fingers of each hand into the os, forcible stretching can easily be done.

Expanding Dilators.—Within recent years dilatation by means of expanding metal dilators of the Bossi type (Fig. 69) has come very much into vogue. The expanding arms act in the same way as the fingers in the manual method, but, unlike the fingers, the arms are not sensitive, and can give no indication when tearing, instead of stretching, is occurring. These powerful instruments must therefore be used with extreme caution, and the expansion must be very slowly accomplished. As soon as there is any strain on the tissues, not more than half a turn of the screw should be given at a time, and about half an hour should be occupied in the dilatation. The finger should be inserted from time to time to feel if there is any tearing. If the cervix begins to tear, the instrument should be closed and withdrawn, and if further dilatation is necessary, it should be done with the hand. When the cervix is not taken up, extreme caution must be used, otherwise extensive lacerations may be caused. When the cervix is partly or entirely taken up, the risk of tearing is not so great, but even then the operator must work slowly, and must never forget that he is using a powerful instrument, with which it is possible to burst the cervix in various directions. Some obstetricians condemn the use of these powerful screw instruments, while others are loud in their praise. I do not think they are now so much used as they were a few years ago; in fact, they are coming to occupy their proper place in the obstetrical armamentarium. In the

hands of a man who knows what he is about such an instrument is most useful, but in the hands of a rash man it may become a veritable engine of destruction.

CUTTING METHODS.

Multiple Incisions of the Cervix.—Dührssen's name is usually associated with this operation. He deserves the credit of having brought the operation prominently before the profession, and of having perfected its technique, but it did not originate with him. A very essential condition of the employment of this operation is that the cervix should be entirely taken up. It has also been maintained that the presenting part should be engaged before the incisions are made. In the great majority of cases, the operation only becomes necessary after engagement has occurred, but I do not think this condition essential.

The number of incisions varies. In some cases two may be sufficient, in others three, while as many as six or seven may be required. Two lateral, one anterior, and one posterior are often employed. If the lateral incisions are extended by tearing, the uterine arteries may be torn through. The risk of injuring the uterine arteries can be lessened, if not entirely obviated, by making the incisions so, that the lateral ones are not made exactly at the side of the cervix. To make my meaning clear, suppose we liken the os to the face of a compass. You see at once that the dangerous incisions lie east and west. If we make four in the ordinary way, they lie north, south, east, and west. The north and south ones are not dangerous, as there are no vessels to be injured, even if they extend by tearing. With the east and west ones it is different, as an extension of them may mean injury to the uterine arteries. If

we are making four incisions, the result as regards dilatation will be just as good if we make them north-west, north-east, south-east, and south-west, and if any of these incisions extend by tearing, no large vessels will be involved. Whatever the number of incisions may be, the east and west positions should be avoided.

The incisions should be made with angled scissors or with a blunt-pointed bistoury, and should be carried out to the vaginal juncture. Dilatation can then be quickly effected with the hand. The child should be immediately extracted, preferably by forceps. If there is no hæmorrhage, one should wait for the natural expulsion of the placenta, but if there is bleeding, the placenta should at once be removed manually. As soon as the placenta is away, the cervix should be drawn down for careful inspection. If there is bleeding from the incisions, stitching will be necessary to control it, but if there is no bleeding, it is not absolutely necessary to stitch.

VAGINAL CÆSAREAN SECTION.

With this operation also Dührssen's name is associated. He suggested it in a paper published on April 1st, 1905, but his first operation was performed on April 24th of the following year. In the meantime an Italian, Acconci, had performed a similar operation in July, 1905, on a woman seven months pregnant, who was suffering from cancer of the cervix. Whoever was the first to perform the operation, however, the honour of having brought it before the profession undoubtedly belongs to Dührssen.

Effacement of the cervix is necessary for the operation of multiple incision, but it is not necessary for vaginal Cæsarean section. The section may, therefore, be done

any time during pregnancy, and before labour has commenced. It is preferable that the presenting part should not have engaged, as version is the method of delivery usually employed. There is one very essential condition, and that is mobility of the uterus. If the uterus should be fixed so that the cervix and lower uterine segment cannot be drawn down, it will be very difficult to make the incision, and the subsequent repair will also be difficult.

When the vagina is narrow and rigid, as in primiparous cases, it will be necessary to enlarge it. Dührssen does this by a perineo-vaginal incision. He makes a vaginal incision between 4 and 7 cm. in length in the right lateral sulcus of the vagina. The upper end of the incision is near the ischial spine, and the lower end below the gland of Bartholin. An external incision is then made downwards towards the right, terminating in the line of the anus and the ischial tuberosity. In the majority of cases these incisions are not necessary, as the vagina can be easily dilated manually.

The cervix is caught with volsella forceps on either side and is drawn down. If there is to be both an anterior and a posterior incision of the cervix, a transverse incision of not more than 4 cm. in length should be made at the postero-vaginal juncture, and a similar incision at the corresponding anterior position. If the vagina is narrow, it is useful to make a longitudinal incision—the so-called T incision—from the centre of the transverse anterior incision towards the meatus. The peritoneum is now separated from the lower uterine segment, and the bladder is pushed well up out of the way. In most cases, incision of the anterior portion of the cervix and lower uterine segments is all that is necessary, but in a few cases, a posterior incision must also be made. When the incision or incisions are com-

pleted, the child is usually delivered by version. If there is no bleeding, one may wait for the normal separation of the placenta ; but, as the operation is only called for in desperate cases, one must generally express the placenta, or remove it manually, so as to shorten the operation as much as possible. As soon as the placenta is away, the cervical and vaginal incisions must be closed with catgut sutures, and the perineal incision with silkworm gut. Many operators have found it necessary to tampon the uterus to control hæmorrhage on account of atony.

It is sometimes maintained that vaginal Cæsarean section is an easy operation, and that it is devoid of risk. Even the expert, however, will occasionally find it a difficult operation to perform, and the not inconsiderable death-rate of the published cases proves that it is not devoid of risk. If we had records of all the cases operated on, I venture to think the death-rate would be higher still.

The risks of the operation are : First, infection, which is common to all operations, but is less in vaginal than in ordinary abdominal ones. To guard against this danger the strictest asepsis must be practised. Secondly, injuries to mother or child. Extension of the incision may rupture the uterus, and on several occasions the bladder has been injured. In a number of cases the child has been born dead, and men have even had to resort to craniotomy. Thirdly, hæmorrhage. This is fairly common, as the uterus is usually in an atonic state. It is necessary always to be fully prepared to tampon.

It has been asserted that vaginal Cæsarean section is the great surgical achievement of the nineteenth century. Undoubtedly it is a great achievement, but it is an operation for experts only, and must be caviare to the general.

In deciding on the best operation to perform in any case, the obstetrician must be guided not only by the condition of the cervix, but also by the amount of his experience. If he is an adept in vaginal surgery, he will probably prefer vaginal Cæsarean section in all cases in which there is likely to be any difficulty in dilatation ; but if he is not an expert, he had better select one of the other methods. If the cervix is soft, and the os partially dilated, the manual method is usually the best one to adopt. Champetier de Ribes' bag or a screw dilator may be used, but instruments are not always to be had when required, while one's hands are always available. In a case of ante-partum hæmorrhage, especially when due to placenta prævia, if the os is not sufficiently dilated for bipolar version, the vaginal plug or Champetier de Ribes' bag should be adopted. The screw dilators are not very useful for these cases, as the cervix may easily be torn. Vaginal Cæsarean section has been strongly advocated as the proper method of treatment in cases of placenta prævia, just as abdominal Cæsarean section has been advocated for the same condition, but, in my opinion, Cæsarean section by either route is quite uncalled for in such cases. Better results can be got by the methods just indicated, and these methods have the advantage of requiring no special skill.

In cases other than ante-partum hæmorrhage, where the cervix is rigid, and the os only admits a finger, manual dilatation will probably be impossible. Bossi's dilator may succeed, but it must be used with very great caution. If the cervix is taken up, the best method is that of multiple incisions ; but, if the cervix is uneffaced, undoubtedly, vaginal Cæsarean section is the operation of election. I have already said that the amount of the medical attendant's experience must be

an important factor in deciding what course to take. If he feels that he himself is not qualified to perform the more critical operation, he should send for skilled assistance, or transfer his patient to hospital.

CHAPTER XXI.

OBSTETRIC OPERATIONS—*Continued.*

Induction of Premature Labour.—Premature labour not infrequently comes on of itself, but there are cases in which it is justifiable to bring it on, either in the interests of the mother or of the child. In the interests of the mother, it may be done in serious diseases of the heart, kidneys, or nervous system, and also in pernicious vomiting. I have also done it, or advised its performance, in cases of phthisis where the patient was showing evidence of an advance of the disease subsequent to impregnation. In such cases, the pregnancy is almost sure to act prejudicially towards recovery, and if it is allowed to go on, the result will be disastrous as regards the mother. Therefore, you are justified in ending the pregnancy, as soon as possible. In the interests of the child, it may be done in cases of obstruction from tumours or contraction of the pelvis, and also in cases of habitual death of the fœtus in the later months of pregnancy. It is occasionally done in normal pelves, where the patient's children have such large heads that delivery at full time is fraught with danger.

As the operation is done in the hopes of getting a child born, which will survive, it should not be done before the child has reached a viable age. Generally speaking, the end of the seventh month is the earli-

est time of viability, but occasionally six and a half months' children survive. If the child is much under 3 pounds in weight, the utmost difficulty will be experienced in rearing it. There is a popular belief that a seventh-month child is more likely to live than an eighth-month one, but this is a delusion. The nearer full time, the better chance there is of its surviving.

With contracted pelves, $2\frac{1}{2}$ inches of a true conjugate is the very lowest limit. A live child may be delivered through this at the seventh month, but if the pelvis is smaller, there is little hope of the child being alive, or surviving, if it is born alive. In all cases below 3 inches the chances for the child are not great, and the mortality among such children, when born alive, is very high, so that it is questionable if induction should be done in pelves below 3 inches. If artificial delivery has to be resorted to, the chances for the child are lessened.

How to decide when to Induce Labour.—In cases done in the interests of the mother, the condition of the patient will generally have to be our guide, but, if possible, the operation should be postponed until she has reached the thirty-second week of pregnancy. In a case like one of uncontrollable vomiting, the mother's interests alone should be considered. The time is judged from the cessation of menstruation, but this is very uncertain, and you are often misled by it, so you must make an estimate of the viability from the size of the foetus, as made out by palpation. When the pelvis is contracted, the size of the foetus, especially of the head, is most important. So long as the head is small enough to pass easily, you will be able to push it well into the brim by external pressure, but, as soon as you fail to do this easily, it is time for the induction. With a con-

tracted pelvis, the rule should be to see the patient every week or so after she has entered the seventh month, to test the size of the head relative to the brim, and to induce labour as soon as ever you find the head cannot be pushed well into the pelvis. The method of estimating the size of the head relatively to the brim has already been described (see p. 113). An instrument has been devised to measure the head through the abdominal wall, but it is of very little use, as the only diameter of the head you can get is the occipito-frontal one, which, in the majority of cases, you do not want. If you could measure the transverse diameter of the head, it would be of great use, but this cannot be done.

In cases of habitual death of the foetus in the later months of pregnancy, about a fortnight prior to the time at which death had occurred on former occasions should be selected, provided this will give a viable child. The results in these cases are so discouraging, that, for my part, I prefer trying to carry the woman to full time by keeping her on chlorate of potash.

Prognosis.—If the woman is in good health, sepsis is the chief risk she has to run, and one should be able to guard against that, by using strictly aseptic methods. When the induction is undertaken, because of disease on the part of the mother, the risk is very great, as, unfortunately, the operation is usually undertaken as a last resort only. As regards the child, it has many risks to run. It may be too premature to survive. If the labour has to be terminated by forceps or version, its chances will be lessened, as premature children do not stand artificial delivery well. There is no doubt that in some cases the vitality is lower than in others. In one of my cases, induction was done twice for contraction of the pelvis, and the children were born easily

without any assistance, and yet in both instances they died in a few days, although they were of a fair size. The third time I refused to induce labour, and did Cæsarean section at full time, and delivered a perfectly healthy child, which did well. For the first month or two the children are very difficult to rear, and they require great attention. If they are under 3 pounds in weight at birth, their chances will not be very great, but 4 to 4½ pound children usually do well.

Methods of Inducing Labour.—What we wish to do is to start uterine contractions, and to get the uterus to empty itself by natural efforts. The contractions may be brought on in various ways, as by rupturing the membranes, injecting fluids such as water or glycerine between the membranes and the uterine wall, by passing bougies, by plugging the cervix and vagina with strips of gauze, or by using hydrostatic dilators. In some cases where immediate delivery is called for, the cervix may be dilated by means of Hegar's dilators and Champetier de Ribes' bag, Bossi's dilator, or manually, incising if necessary, but such a case is not usually considered an ordinary induction (see chapter xx).

Of all the methods the most useful is the bougie one. Rupturing the membranes is not advisable, as the child will suffer from pressure and probably be still-born. The injection of glycerine was strongly advocated at one time, but it is not by any means devoid of danger. Barnes' bags are very useful when the cervix is partially dilated, and they may be used after the bougies have been tried for a time. The membranes must, if possible, be kept intact until the os is fully dilated, so as to assist dilatation, and save the child from prolonged pressure.

Bossi's dilator has been used, but I do not consider

its use advisable, unless the case is one requiring immediate delivery.

Preparation of the Patient.—She should be well bathed several times beforehand. The bowels should be cleared by means of laxative medicine and an enema. It is advisable to shave the external parts, or, at all events, to clip the hair short, so as to render the external pudenda as aseptic as possible. Only new gum-elastic bougies should be used. Boiling softens them and roughens their surfaces, so it is better to sterilize them by first washing them very carefully with soap and water, and then soaking them for several hours in (1 to 20) carbolic, or (1 to 2000) corrosive sublimate lotion. Several No. 10 or 12 size may be used, or one very large one. Catheters should never be used. For the introduction you should have a duck-bill speculum, a pair of volsellum forceps to draw down and steady the cervix; packing forceps, and iodoform or aseptic gauze for a vaginal plug, and if the os is quite closed, a few Hegar's dilators.

The Operation.—Chloroform is not necessary, but it is advisable to administer it. With the patient in the lithotomy position, thoroughly cleanse the external parts with lysol solution, and douche the vagina. Pass the speculum, and draw down the cervix, by catching the anterior lip with forceps. If the os will admit a finger, pass it in, and separate the membranes as high up as you can reach. If the os is quite closed, dilate it with Hegar's dilators until it will admit a finger. The bougie should now be passed without touching any of the external parts. It should be gently inserted, and if it meets with an obstruction it should not be forced in, but partially withdrawn and pushed in another direction. The placenta is the usual obstruction it meets with, and it will not do to force the bougie be-

tween the placenta and uterine wall, or accidental hæmorrhage will be caused. The bougie should be passed in, until its end is at the external os. Two or three may be passed in this way. I prefer several to one very large one, as there is less risk of injuring the placenta or rupturing the membranes. There should be very little bleeding. The vagina should again be washed out, and packed lightly with iodoform or aseptic gauze. The vaginal plug prevents the bougies slipping down, and it also assists dilatation. If you should rupture the membranes or injure the placenta, the bougies should be withdrawn and a Barnes' bag inserted, or the cervix and vagina thoroughly plugged. In two of my cases, I have met with marginal placenta prævia.

The patient may be allowed to rise, but she is much safer in bed. The pains very rarely come on within a few hours, and it is well to warn the patient that it will probably be some days before the labour is finished. The plug should be taken out of the vagina within twenty-four hours. If the os is not dilating much, the bougies may be taken out, and a new set introduced, or they may be left in twelve hours longer. When the contractions are fairly started, the bougies may be removed. If dilatation is very slow, you may hasten it by the use of bags, and if the membranes rupture early, a bag should be inserted, to dam back the liquor amnii as much as possible. A natural finish to the labour is preferable, but it must not be allowed to linger too long. The after-treatment of the case is the same as after an ordinary full-time labour.

The child will be feeble, and the greatest care must be taken of it. If it is very small, it should be rolled in cotton wadding, instead of being dressed in the usual way. In hospital, an incubator is generally at hand to keep it in, at a temperature of about 90° F. In

a private house and be kept in a basket near a fire, and with hot bottles round it. It should be fed every hour at first, giving it human milk, if possible, from the very first; if this cannot be obtained, very dilute cow's milk with a little cream and sugar added. As soon as it can suck, put it to the breast.

Version or Turning.—The object of this operation is to change one presentation into another. It may be the head which is substituted for some other part, but more usually it is the breech. Transverse presentations are the typical ones.

1. **Cephalic Version.**—In this, the head is substituted for some other part of the body, most usually in a transverse presentation, but it may be done in a breech presentation. It is done by external manipulations while the membranes are intact, and is only practicable when the liquor amnii is abundant. The patient should lie upon her back, with her knees well drawn up. Between the pains, if they are occurring, the head is pushed towards the pelvis, and the breech in the opposite direction. If a pain comes on, the parts are supported, until it has passed off. If the manipulations are performed before labour has come on, it is generally a very easy matter to bring the head to the brim of the pelvis. When the head has been brought to the brim of the pelvis, it should be kept there by means of pads and a firm abdominal binder; but if labour is going on, a better method is to rupture the membranes, and when the liquor amnii has drained away, the head will become fixed in the brim, and it will be prevented from taking up its old position. Whenever, towards the end of pregnancy, a child is found to be lying transversely, this operation should be performed.

2. **Podalic Version.**—In this, the breech is the part which is brought into the brim of the pelvis. It is the

method of delivery most frequently used in cases of ante-partum hæmorrhage, when the presentation is cephalic or transverse. It is not adopted in transverse cases where cephalic version cannot be done. It was formerly much used, but the use of axis-traction forceps superseded it. As I have already mentioned, it is not used in parietal presentations in the face and brow positions. In face and brow presentations, if it is not possible to deliver by the use of forceps, it is called for in the case of eclampsia, it is done.

METHODS OF PERFORMING PODALIC VERSION.

1. **External Method.**—This can only be performed before the rupture of the membranes, and when the liquor amnii is abundant. It is done by external manipulation, in exactly the same way as cephalic version, only it is the breech, and not the head, which is brought to the pelvic brim.

2. **Bipolar Method.**—This method of version was introduced by Braxton Hicks in 1864. It is done by external manipulations, combined with tilting the presenting part away from the brim by the fingers of one hand in the vagina. The membranes should be intact or only recently ruptured. If the uterus is retracted round the child, it is quite impracticable. It may be used in doing cephalic version, but it is more generally employed in podalic, or, in other words, it is usually the breech, and not the head, which is brought into the brim. In cases of placenta prævia, it is most useful, as it can be done as soon as the os will admit two fingers. The patient should be placed in the lithotomy position and be deeply anæsthetized, to relax the parts and



FIG. 70.—Bipolar version : First step.
(After Barnes.)



FIG. 71.—Bipolar version : Second step.
(After Barnes.)

allow the whole hand to be pushed into the vagina. The external hand is placed over the breech, so as to depress it ; while the presenting part is tilted away from the brim, by the fingers inserted through the os. The fingers press against the front of the child and flexion is lessened (Figs. 70 and 71). When the head is out of the brim the external hand can be used to elevate it towards the fundus (Fig. 72). As soon as a knee or foot comes within reach of the internal fingers, it should be caught and brought into the brim, the membranes being ruptured at the same time (Fig. 73). If the os is fully dilated, delivery may be finished at once, as in an ordinary breech case ; but if the os is only partially dilated, it must be left to nature, to allow of dilatation.

3. **Internal Method.**—This is done by passing one hand into the uterus, seizing and bringing down one or both feet. The cervix must be sufficiently dilated to allow the hand to pass. It should be done as soon as possible after the membranes have ruptured. If there is only slight retraction of the uterus, it may be done, by an expert operator, by deeply anæsthetizing the patient, but one who has not had much experience of the operation should not attempt it. If the uterus is firmly retracted it should never be attempted. The patient may lie on her left side, or preferably on her back. The right hand may be used in all cases, but in some the left one does better. It depends on which way the child is lying. Use the hand which will most easily reach the front of the child. Thus, if its back is towards the mother's right side, use your right hand, and if the back is towards her left, the left hand ; but if you are not accustomed to working with your left hand, always use the right. The hands and arms should be thoroughly sterilized, and well washed in lysol solution. Pass the hand in a cone shape to dilate



FIG. 72.—Bipolar version; Third step.
(After Earnes.)



FIG. 73.—Bipolar version; Fourth step.
(After Earnes.)

the cervix, if it is not sufficiently dilated already, and pass the hand on to the front of the child, rupturing the membranes, if they are unruptured (Fig. 74). As much of the liquor amnii as possible should be retained in the uterus by damming it back with the wrist. If a contraction comes on, spread your hand flat on the front of the child and wait until the uterus relaxes. If you do not do this, the pressure upon your closed hand

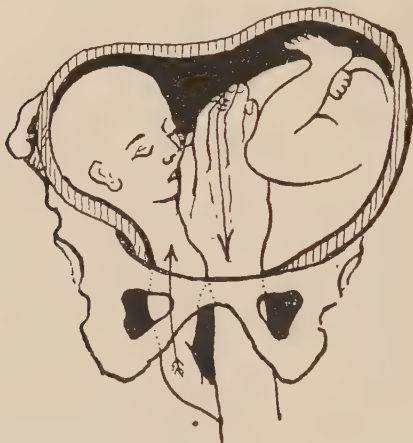


FIG. 74.—Podalic version: Internal method. (After Barnes.)

will almost paralyse it, and may cause rupture of the uterine wall. Catch one or both feet, making sure it is a foot and not a hand. Herman advises bringing down a hand first and attaching a bit of tape to it. This I consider to be a mistake. As soon as you get a foot, pull the leg down steadily into the vagina, if the uterus is quiescent, but if a contraction comes on, wait, spreading your hand out as before. The child's body usually rotates quite easily, unless the uterus is retracted round it. If version is attempted when the uterus is retracted,

as in a transverse case, care must be taken to unhitch the shoulder from under Bandl's ring, if it is caught, but only an expert should undertake such a risky operation, and it should only be undertaken, if there is a chance of saving the child's life. The final part of the delivery is carried out in exactly the same way as when the breech presents.

Which Foot should you grasp ?—When the head presents, it does not matter much which foot you seize, but in transverse presentations it depends upon whether the child lies dorso-anterior or dorso-posterior. If it is dorso-anterior, take the nearest foot, and if it is dorso-posterior, that furthest away (Fig. 74). When the child's back is to the front, you want it to remain so, and you therefore seize the nearest foot, as traction on it will not rotate the body round its long axis, but when it is to the mother's back, you wish to turn it to the front ; therefore, seize the furthest away foot, as traction on that leg will not only turn the child, but rotate its back to the front.

4. **Combined Internal and External Method.**—The internal hand is used in exactly the same way, but, with the external hand, the head is pushed towards the fundus.

RISKS OF VERSION.

1. **To the Mother.**—Besides the risk of introducing septic organisms into the uterus, there are risks of injury to the uterus, cervix, vagina, and perineum. The uterus may easily be ruptured. I have already spoken of the risk of attempting version after failing to deliver with forceps, and I again insist that if forceps hold, and do not bring the head down, version should not be attempted. Most of the cases of rupture of the

uterus, brought into the Maternity Hospital, have been caused in this way. The cervix may be ruptured by dragging the after-coming head through too rapidly. If this happens in a case of placenta prævia, death from hæmorrhage is almost sure to ensue, if the cervix is not at once stitched or plugged. Rupture of the vagina and perineum may occur, if the head is delivered too hastily and extended.

2. **Risks to the Child.**—The leg or legs may be injured, fractured or dislocated. The arms may be

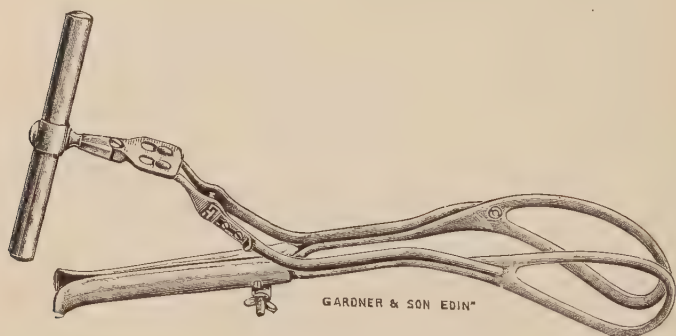


FIG. 75.—Milne-Murray's axis-traction forceps.

broken or dislocated in relieving them, and the clavicles may suffer in the same way. The neck may be so stretched as to cause dislocation, or the cord may be injured without actual breaking of the neck. In contracted pelvises the skull may be fractured by the pressure of the promontory, and in some cases hæmorrhage occurs into the brain, without actual fracture of the skull. The child runs exactly the same risks during delivery as when the breech presents, and traction has to be used.

The Forceps.—The Tarnier-Simpson axis-traction forceps of Milne-Murray and of Sir A. R. Simpson are the

instruments I have found most useful. Their great advantages over the ordinary instrument specially appear in high cases, but in low cases they also possess advantages, so that they are adapted for all deliveries. The traction rods enable you to pull in the proper axis, while the handles indicate the direction of the axis.

Conditions in which the Application of Forceps is Necessary.—These have already been mentioned in discussing the various forms of labour, so we shall merely recapitulate. They are : Uterine inertia, large size of



FIG. 76.—Prof. Sir A. R. Simpson's axis-traction forceps.

the head, malpresentations and malpositions of the head, hardness of the head, rigidity of the vagina and perineum, contraction of the pelvis (conjugata vera not below 3 inches as a rule, but delivery may sometimes be effected with a conjugate of not more than $2\frac{3}{4}$ inches, if the child's head is small), in some cases of tumours, and in cases where rapid delivery is called for in the interest of the mother or of the child. In breech cases forceps are occasionally applied to the breech, and sometimes to the after-coming head.

Preparations.—The consent of the friends of the patient must be obtained, and also that of the patient,

unless she is extremely nervous. Chloroform is not always necessary, but it is best to give it, unless the patient strongly objects to its use. It will save her suffering, and make the operation much easier. The patient's bowels and bladder should be empty, and the external parts thoroughly cleansed. The instruments, which should be aseptic, are frequently lubricated with an antiseptic oil or vaseline, but if they are dipped in warm lysol solution they will be slippery enough, and there will be less risk of carrying sepsis into the uterus. Antiseptic oils and vaseline are frequently far from being aseptic. The instruments should be covered by the solution.

Position of the Patient.—In this country, the left lateral position is the one most frequently adopted. The hips should be brought well over the edge of the bed, and the legs should be well drawn up. If the dorsal position is adopted, the hips must be brought well over the edge of the bed, and the legs and thighs well flexed and supported by assistants. The bed should be properly protected by a waterproof sheet and draw-sheet.

Before applying the instruments, the os should be fully dilated, the membranes ruptured, and the exact position of the head known. The blades are made to lie in the sides of the pelvis, and therefore in the high operation they grasp the head obliquely in a normal pelvis, or antero-posteriorly in a flat pelvis. Some authorities say that the blades should always be applied to the sides of the head even in high operations. This is quite impracticable in the majority of cases. One blade will lie over the temple and eye of the child, but beyond bruising the parts a little it should not do any damage. If the instruments are not properly made, considerable damage may be done.

Application of the Blades.—The left or lower blade is

the first to apply. The traction rod should lie along the back of the shank. Either hand may be used, but the left is perhaps the more convenient of the two. Grasp the handle lightly in the left hand, pass the fingers of the right into the vagina, with the tips inside the os, the palm looking upwards, then slip the point of the blade along the palm of the hand and front of the fingers, until it passes within the cervix. Next push it



FIG. 77.—Application of the left or lower blade of the forceps.

gently upwards and forwards, depressing the handle at the same time until it lies against the perineum. The blade should lie exactly in the left side of the pelvis. No force should be used. An assistant should now steady it in position. The upper blade is generally more difficult to apply, but with a little practice it is easily done. An assistant should hold the leg up. First swing the traction rod well forwards, then grasp the handle lightly in the right hand, pass the fingers of the

left hand into the vagina, until the tips are within the os, the palm looking downwards, then enter the tip of the blade in the axis of the outlet—*i.e.* with the shank and handle parallel to the flexed thigh ; now pass the blade along the palm of the hand and front of the fingers, gradually bringing the handle back towards the perineum. The tip of the blade should pass up the back of the pelvis, and then gradually come round to

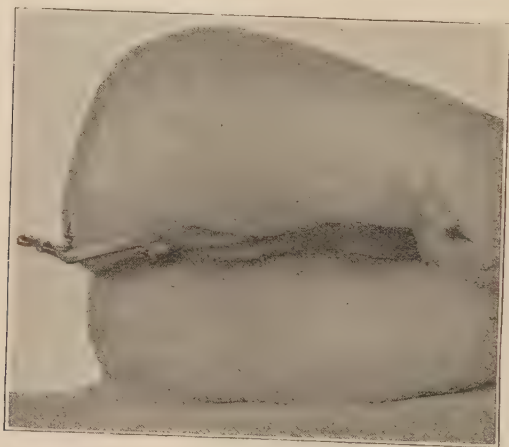


FIG. 78.—Left or lower blade of the forceps in position.

the side, and slip over the head. As it slips over the head the handle comes back towards the perineum. Locking the handles is sometimes rather difficult, but no force should be used. Grasp each handle separately, and gently manipulate them into exact apposition, and lock them, being careful not to nip the vaginal mucous membrane or the skin of the external parts in the lock. Then swing the traction rod of the right blade back, and lock it. The fixation screw of the handles should now be applied, tight enough to fix the handles in

the position in which you have locked them with your hand. If the application handles do not come quite together, you must not use the screw to bring them together, or you will crush the head. The fixation screw is only to fix the handles in the position in which you can close them with your hand, and should never be used to screw the handles together. Now apply the crossbar to the traction rods. Before applying traction,

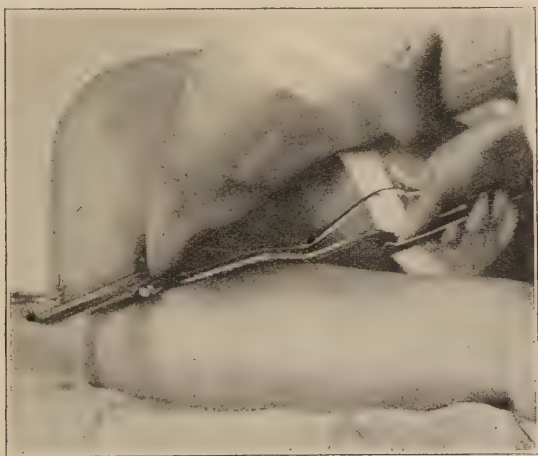


FIG. 79.—Application of the upper or right blade of the forceps.

examine carefully to make sure that everything is right, and that none of the pubic hairs are caught in the lock.

Traction.—Grasp the crossbar in one hand and pull gently, so that the traction rods are parallel with the shanks. As soon as the application handles begin to pass forwards, move the traction rods forwards, so as to keep them parallel with the shanks. If the patient is under chloroform, make traction at intervals, always relaxing the fixation screw when not pulling. If the

patient is not under chloroform, you may make your traction during a pain. Do not be in a hurry, but take plenty of time. As the head descends it will rotate, and the blades should then be taken off and reapplied to the sides of the head. In low forceps cases the head is in the pelvis, and, as rotation has occurred, reapplication will not be necessary. When the head begins to bulge the perineum, you must deliver very slowly. The

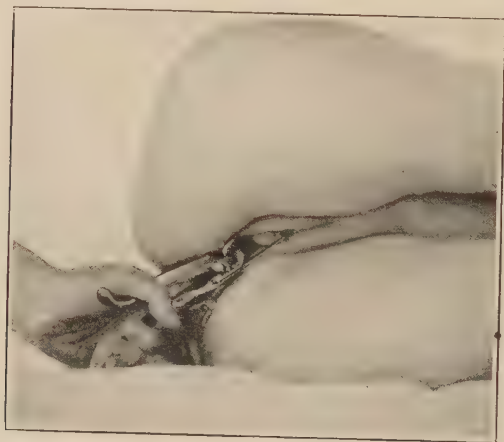


FIG. 80.—Blades of the forceps in position and instrument locked.
Right traction rod still in front.

handles will now be well forward between the patient's thighs, and you must follow them forwards with the traction rods. Some operators complete the delivery by grasping the traction rod and handles, and using the forceps like any ordinary pair, but this is a mistake. The ordinary handles should never be touched during traction. I have seen men deliver by grasping the handles as well as the crossbar, while bringing the head through the brim and cavity, but this should never be done. It really destroys the axis-traction action. As

soon as the head is born the blades should be removed. Delivery is then completed in the usual way.

The Amount of Force to be used.—In ordinary cases very little force is required, but with contracted pelves, or with large heads, a considerable amount may be necessary. If the instruments hold, any head may be dragged through by main force, but an excessive amount is not justifiable. An expert operator soon learns how much

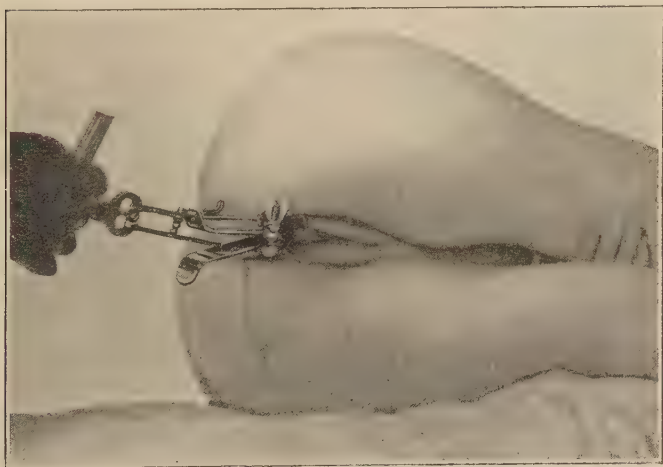


FIG. 81.—Instrument fully applied. Traction above brim.

force he may justifiably apply, but he can only learn this by experience. I have frequently delivered live children by exerting my utmost strength with both hands, and my feet braced, but I would not advise a beginner to attempt this. One hand will give all the force required in the majority of cases. By placing the tips of the fingers of the other hand against the head, you can judge if any advance is being made. If no advance is being made, after a considerable amount of



FIG. 82.— Forceps delivery. The head is distending the perineum. Observe the direction of the traction.



FIG. 83.—Forceps de ivory. The head is just passing the vulva. Observe the direction of the traction.

force is used in the ordinary obstetric position, a trial should be made in the Walcher position, and if you fail then, a symphysiotomy or a craniotomy should be resorted to. Cæsarean section might be done, but the risks would be very great. If the child is dead, craniotomy should be done at once, but if it is alive, symphysiotomy or pubiotomy is the operation indicated. I again repeat, that under no consideration should



FIG. 84.—Forceps delivery in Walcher's position.

version be attempted after failure with forceps, if the instruments have held.

When the head is delivered, the body usually comes away without difficulty, unless there is some abnormality about the chest or abdomen of the child. A short cord may cause delay, but strong traction will tear it through. Occasionally, the large size of the child's body will obstruct the delivery. Do not apply excessive traction to the head, for fear of breaking the child's neck. Pass your fingers in, and hook the arms down, and then the body should come down, unless it is distended by a

tumour, ascites, or hydrothorax. If the child is dead, and there is much difficulty in getting the body through, cut one or both clavicles, and perforate the chest, and also the abdomen through the diaphragm, if the abdomen is distended ; but these cases have already been dealt with.

I am indebted to Dr. James B. Whitfield for his kindness in taking the photographs from which the plates Figs. 77 to 83 were made, and also those of the operation of craniotomy, Figs. 93 to 96.

CHAPTER XXII.

OBSTETRIC OPERATIONS—*Continued.*

OPERATIONS DESTRUCTIVE TO THE CHILD.

WITHIN recent years, since Cæsarean section and symphysiotomy have become comparatively safe operations, destructive operations upon the child have gradually lessened in number. Some authorities state that a destructive operation upon a living child is not justifiable, but I cannot agree with them. For instance, cases are occasionally brought into hospital after prolonged efforts have been made to deliver with forceps. The vagina and uterus are already infected, and the operation of Cæsarean section or symphysiotomy would almost assuredly result in sepsis and disaster. The child might be saved, but the woman would stand a very small chance of recovery. A destructive operation on the child gives the mother a very much better chance than either of the other operations. This is not theory, but is the result of a large experience. When the child is dead, it goes without saying that it should be broken up, if it cannot be delivered entire.

Destructive operations are required in obstructed labours, where neither Cæsarean section nor symphysiotomy is justifiable—*e.g.* with a dead child, with a live child where frequent futile efforts have been made to deliver, and also in cases where the vagina is very septic.

In case of hydrocephalus and monsters, the mother should not be subjected to any risk in attempting to deliver, so if there is any obstruction, a destructive operation should be done at once. I have seen more than one case of rupture of the uterus from the delivery of an unperforated hydrocephalic head.

Destructive Operations upon the Head.—In many cases perforation of the skull, and evacuation of the brain, or fluid in a hydrocephalic head, is all that is necessary. In some, the vault of the skull must be crushed, while in others the base also must be dealt with before delivery can be effected.

INSTRUMENTS.

1. **Perforator.**—There are a number of forms of this instrument, but Simpson's is one of the best. The instrument should be sharp at the point, and either quite straight, or slightly curved on the flat.

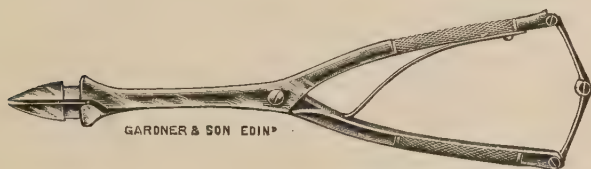


FIG. 85.—Simpson's perforator.

2. **The Craniotomy Forceps or Cranioclast.**—The instrument consists of two separate blades, united by a lock similar to the British lock of the forceps, or a pivot and slot, and with a fixation screw at the end of the handles. Simpson's instrument, without the fixation screw, is of very little use. The blades should be curved to correspond with the curve of the foetal head, and the outer blade should be serrated on its concave,

and the inner blade on its convex, surface so arranged that when the instrument is locked the serrations should fit into one another. The outer blade is fenestrated and the inner solid. A long instrument should always

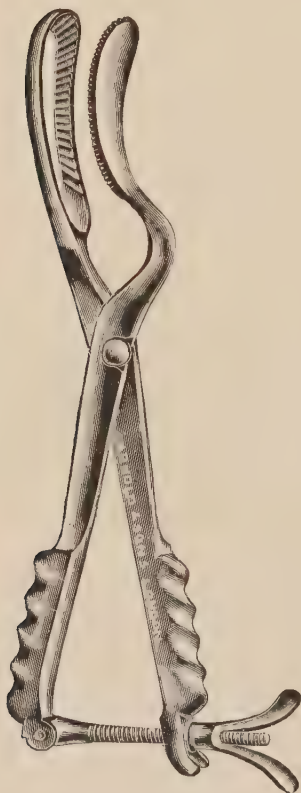


FIG. 86.—Craniotomy forceps. (Barnes.)

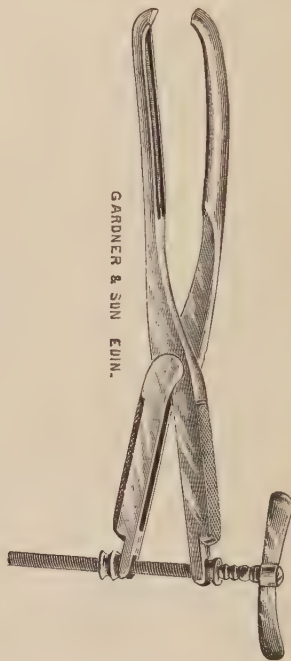


FIG. 87.—Cephalotribe.

be selected, as it gives greater purchase. It may be used to break up the vault and also to make traction.

Cephalotribe.—This is a very powerful instrument for crushing the head. The blades have a slight pelvic

curve, but almost no cephalic curve, so that when they are closed there is very little space between them. The lock is the same as that of the forceps, and at the end of the handles there is a powerful screw for closing the blades. The blades are not fenestrated, but grooved and serrated. Braxton Hicks' instrument is the best.



FIG. 88.—Author's combined instrument.

It is used to crush the head, and then deliver it by traction.

Combined Instrument of Auvard.—This instrument consists of three blades. The inner one may be pointed for use as a perforator. It is slightly curved and serrated on its convex aspect. On the shank of this blade

there are two pivots, one on each side, on which slots in the two outer blades lock. There are also two hinged bars with slots in them, which fit on to pivots on the handles of the two outer blades, to fix them, and at the end there is a hinged screw for closing each blade as it is adjusted. The outer blades may be solid or fenestrated, but should be serrated. The whole instrument is straight, with scarcely any cephalic curve. Auvard's original instrument is too short. I have had it considerably lengthened, and have made the centre blade to screw into the base of the skull. This prevents slipping. The inner blade is passed first, after the brain has been evacuated, then the left one, which should lock behind, and finally the right one, to lock in front. If the outer blades get a good grip they will completely flatten the head, and as the head elongates it will rotate, so as to bring the long diameter into the transverse at the brim. The blades will now lie antero-posteriorly, and as they are straight, they will allow of the flattened head being dragged through the brim. The instrument is a little troublesome to apply, but, after a little practice with it, I have found it the most useful of all in cases of badly contracted pelvis, and now use nothing else.

Basilyst.—This instrument of Professor Simpson's is intended for boring into, and breaking up, the base of the skull. It is formed into a tractor by adding an outside blade like that of a cranioclast, which is applied to the outside of the head, and thus enables you to deliver. The inner portion consists of two hinged portions which end in a screw. It may be used to perforate the vault first, but its main use is to break up the base. It is screwed into the base, and then the parts are separated by means of a screw at the end of the handle. After the base is broken up, the outer

blade is applied, and screwed up just as in a cranioclast, to enable you to make traction. I have had a fair amount of experience with the newest form of the in-



FIG. 89.—Simpson's basilyst tractor, instrument closed.

strument, which is certainly an improvement on the older forms, but I cannot say it has been as useful as the combined instrument just described.

Several other instruments are useful in operations on the head. A long pair of bone forceps may be used for

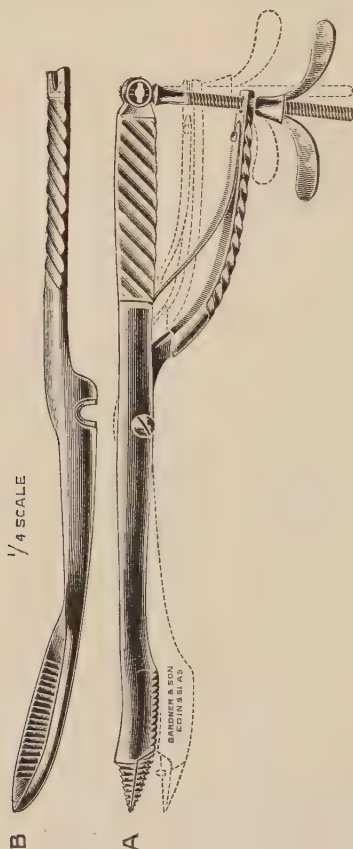


FIG. 90.—Simpson's basilyst tractor.
A. Inner portion. B. Outer blade.

nipping off any sharp spicules which may protrude through the scalp. A crotchet is used for making traction. For clearing out the brain, an ordinary douche nozzle may be used, or a flushing curette.

Craniotomy.—Prepare the patient in the usual way by cleansing the external parts and scrubbing the vagina out with lysol solution.



FIG. 91.—Child delivered by the combined instrument. The clavicles have been cut (cleidotomy) to allow the shoulder girdle to collapse.

Perforation.—The patient may lie on her left side, but it is better to have her in the lithotomy position, with the legs well supported. The os must be dilated as fully as possible. Pass the fingers of the left hand

into the vagina, until their tips rest against the head. The perforator, which is closed, is grasped in the right hand, and passed along the palm of the left hand, until the point of it comes against the centre of the presenting part of the head. You must carefully guard its sharp edges, so as not to cut the vaginal wall while passing it. Press it firmly against the head, first through the scalp and then through the bone, being careful not to allow it to slip. A blunt instrument slips readily, so the point should always be sharp. If the bone is hard, a considerable amount of force may be required. An assistant should keep the head firmly pressed against the brim through the abdominal wall. When the instrument has passed in up to the shoulder, separate the points of it by drawing back the spring and closing the handles. This should be done first in the transverse of the pelvis. Now close the instrument and rotate it, and open it again in the antero-posterior diameter of the pelvis. Close it again, and push it on and break up the base of the brain very thoroughly, so as to kill the child and allow of easy evacuation of the brain. I need hardly say it is important effectually to destroy the child before it is delivered. The tenacity of life is extraordinary. I have seen indications of life in a child where the brain had, apparently, been all removed, and the head had been crushed with the combined instrument. The perforator should be withdrawn closed and carefully guarded. Some operators advise avoiding the sutures or fontanelles in perforating, but this is of little importance. Select the most accessible point. In perforating an after-coming head, behind an ear may be selected, or in some cases under the chin, or through the roof of the mouth.

It is always well to clear the brain out as thoroughly as possible, and this can easily be done with the douche.

The ordinary nozzle, a flushing curette, or Bozeman's intra-uterine catheter, may be used.

In many cases delivery can now be effected by forceps, or in breech cases by traction on the body, but in bad

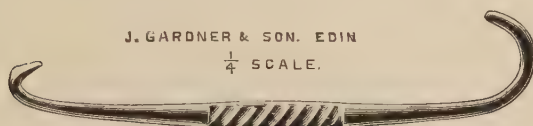


FIG. 92.—Crotchet and blunt hook.

cases of obstruction the head will have to be diminished. This may be done by craniotomy forceps. The inner blade is passed into the cavity of the skull, and the outer



FIG. 93.—Application of Author's combined instrument. The centre blade has been screwed into the base of the skull, and the left blade has been applied screwed up and fixed in position.

under the scalp, between it and the bone if possible, and the bone is then twisted off, leaving the scalp to prevent sharp edges lacerating the vagina. In many

cases the cranioclast is applied at once. The inner blade is passed into the skull, and the outer applied over the head, and then locked and screwed up tight. You now make steady traction in the axis of the pelvis, being careful to feel that there are no sharp spicules of bones projecting beyond the scalp. If there are any

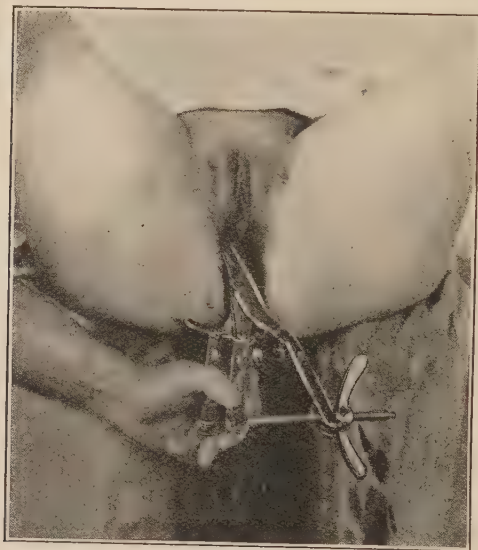


FIG. 94.—The right blade has been applied, but the head has not yet been crushed.

spicules, they must be twisted off, or severe injury may be done to the vagina. The head will tilt and usually come down, but if there is great contraction, it is better to crush the head, or break up the base by means of the basilyst.

The combined instrument I have found the most useful. After the brain is evacuated, pass the inner blade and screw it into the base of the skull. While

this is being done an assistant should steady the head to prevent it moving. Now pass the left blade over the side of the head and lock it behind, and screw it up until the hinged bar can be locked on to its pivot. Next pass the right blade over the other side of the



FIG. 95.—The head has been crushed. The instrument now lies in the antero-posterior diameter of the pelvis. This is the position in which traction is made until the head is brought through the brim of the pelvis.

head, and lock it on the front pivot. Then swing the screw round and screw the handle home, until the hinged bar can be locked on to its pivot. While the blades are being screwed up, care must be taken not to catch the cervix or vaginal wall. As the head flattens it will rotate, so that the locked instrument will lie in the conjugate. Traction should now be made in the axis

of the pelvis. If a good grip has been got of the head, it will come through with surprising ease. The advantage this instrument has over the ordinary cephalotribe is that it is lighter, and that as it is straight it allows of the head rotating, and being delivered with its elongated diameter in the transverse of the brim.

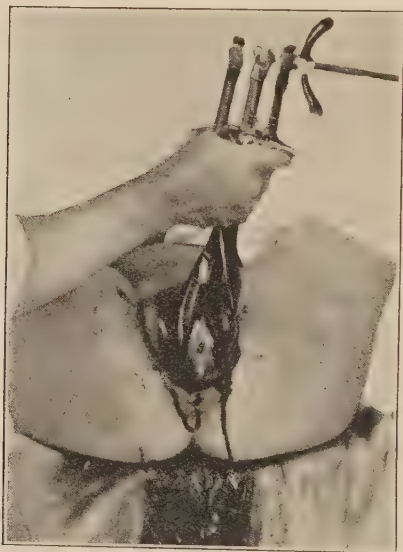


FIG. 96.—Delivery of the crushed head through the vulva. Observe that the blades are now in the transverse diameter of the pelvis.

The ordinary cephalotribe is applied to the head just as the blades of the forceps are, and it is then screwed up, so as to crush the skull. Delivery is then effected by traction, as with forceps. The crotchet is a useful instrument to make traction with, by hooking it into some part of the skull, only care must be taken to guard against its tearing out and lacerating the maternal parts or the palm of your own hand. It may be used

alone, or in combination with any of the other instruments.

Care must be taken to prevent laceration of the vagina by the edges of the bones, but, if the scalp covers them well, there will not be much risk. The fingers of one hand should always be kept against the bones, to feel if any sharp point projects.

When the head is delivered, there may be some difficulty in getting the chest through. This may be overcome by cutting through one or both clavicles, and, if necessary, perforating the chest. The clavicles may be cut by means of a pair of long scissors. Cutting the clavicles has recently been advocated in Germany under the name of *cleidotomy*. The name is the only new thing about the operation.

If there is difficulty in reaching the clavicles, the delivery will be facilitated by removing the head and then perforating the chest, or cutting one arm off at the shoulder with a decapitating hook.

EMBRYOTOMY.

In impacted transverse cases, the body or neck of the child is the part which can be reached, and must be attacked. Again, in cases where the chest or abdomen is very much enlarged, either by new growths, dropsy, or gas, a destructive operation will be required.

1. **Evisceration.**—An opening is made into the most accessible part of the abdomen or chest by means of the perforator or a pair of scissors, and the contents removed. If the head is still *in utero*, it should be perforated after the body has been delivered, if it will not come through easily.

2. **Spondylotomy.**—In a transverse case, besides evisceration, it will probably be necessary to cut through

the spine to allow of the foetus being easily doubled up. This may be done with strong scissors.

3. **Decapitation.**—In impacted transverse cases, when the neck is within reach it should be divided. This may be done by means of a blunt hook, or by Ramsbotham's sickle hook. Scissors or an *écraseur* may be

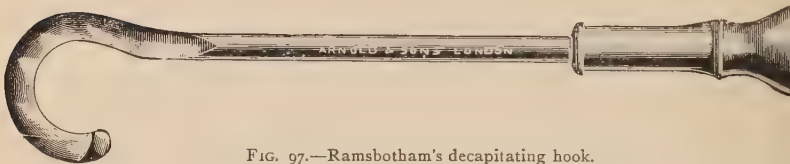


FIG. 97.—Ramsbotham's decapitating hook.

used. The blunt hook is used by twisting, and considerable force will be required. Ramsbotham's hook will cut through the neck quite easily. Care must be taken not to injure the maternal parts in passing it. When it is once fairly round the neck, steady and careful traction should be made, and it will cut through the tissues without difficulty.

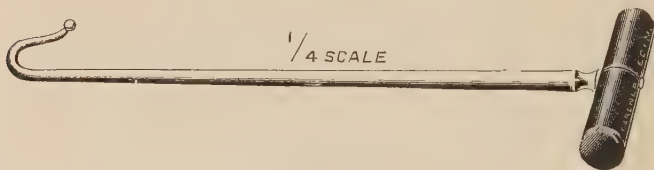


FIG. 98.—Blunt decapitating hook.

Ramsbotham's hook is a very satisfactory instrument when it is applied, but in contracted pelves there is great difficulty in hooking it round the neck. The blunt hook can be very easily applied, but great force is required to break the neck, and if the lower uterine segment is thinned out, the twisting round of the head may rupture it. I have modified the blunt hook by

placing a knife in it (Fig. 99). It is as easily applied as the blunt one, and will cut through the neck as speedily as Ramsbotham's. I have used it frequently, and have found it a much better instrument than Ramsbotham's.

After the neck is severed, the body can be brought away by traction on the arm. The head must then be delivered by suprapubic pressure, with traction applied

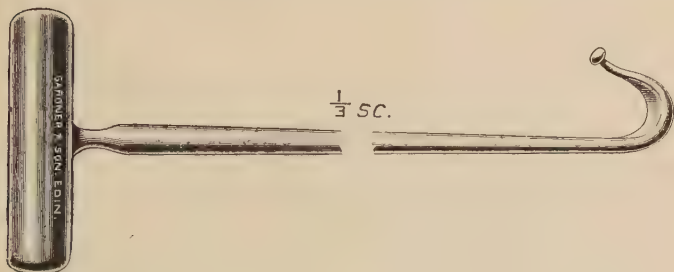


FIG. 99.—Author's decapitating hook.

by the crotchet or forceps. It may be necessary to perforate it and use the cranioclast.

Except in the case of locked twins, decapitation should never be done after the body is born, as it is sometimes very difficult to deal with the retained head, especially if the pelvis be contracted.

Embryotomy may be a comparatively easy operation, or it may be one of the most difficult imaginable, when the uterus is firmly retracted round the child and the retraction ring presents (see chapter x).

CHAPTER XXIII.

OBSTETRIC OPERATIONS—*Continued.*

SYMPHYSIOTOMY.

THE operation of opening the symphysis was devised by Sigault more than a century ago, but as antiseptics were then unknown, the results, as regards the mothers, were exceedingly bad, and the procedure was abandoned. Within recent years it has been revived, first in Italy and then in France. In Britain it has been done fairly often of late, but it has not been so enthusiastically taken up as on the Continent. With proper care it can be done with a very small mortality, and in suitable cases it certainly should be preferred to craniotomy on a living child. As it does not prevent subsequent child-bearing, it may be done repeatedly on the same patient, but in many cases it has been found that, in subsequent labours, the slight increase in the size of the pelvis and the yielding at the joint allow of delivery by natural efforts or by means of forceps.

It is a suitable operation with a conjugata vera of not below 3 inches, provided that the head is not disproportionately large. It may be done in a $2\frac{3}{4}$ -inch pelvis, if the head is small, but such cases are more suitable for Cæsarean section. Its range of practicability is thus the same as that of induction of labour. Of course, if the case has gone to full time, induction is out of the question, but if the woman is seen in time, and

there is a reasonable chance of getting a live child at the eighth month, induction should be preferred.

Dangers of the Operation.—If the bones are too widely separated, there is great risk of laceration of the soft parts, including the urethra and bladder, and the bleeding may be very severe from the plexuses of veins, which are usually varicose. Again, the sacro-iliac synchondrosis may be injured and the woman permanently lamed. In some cases, the union between the ends of the bones has not been strong enough, and walking has been interfered with. Sepsis is always a very real danger, because, from the situation of the wound, it is difficult to guard against it. The difficulty of nursing the patients is a very great drawback, as no movement can be allowed until union has occurred.

Indications for the Operation.—The child should be alive and the head not much overlapping the symphysis, so that there is a reasonable chance of getting the child delivered without separating the bones too far. If attempts have been made to deliver by forceps, and the vagina is septic, there will be great risk to the patient. The cervix should be sufficiently dilated to allow of delivery without risk of laceration.

Preparation of the Patient.—The external parts must be shaved and rendered as aseptic as possible. The bladder and rectum should both be thoroughly emptied, and the vagina well douched and cleansed. When the os is dilated sufficiently to allow of delivery, the operation should be done at once.

The Open Method.—Instruments required : A strong, narrow-bladed bistoury, a director, a number of pressure and artery forceps, a bladder sound, large, curved needles and a holder, catgut, silkworm gut, axis-traction forceps, a long strip of rubber plaster.

The patient should lie upon her back. Cut directly

down upon the joint, and extend the incision a little above the top of the symphysis, to allow you to separate the parts behind the joint from above. Place a sound in the urethra to keep it to one side. You may now cut down through the joint, taking care to sever all the ligaments, especially the subpubic one. The joint should gape a little, but the bones do not spring apart more than $\frac{1}{2}$ inch. Bleeding should be dealt with by securing the vessels, but in many cases this is impossible, as there is general and very profuse oozing. A temporary plug of iodoform gauze should be put into the wound until delivery is effected. When the joint is brought together again, the bleeding will be checked. Take the sound out of the urethra, and get an assistant to apply forceps to the head. Delivery should be done slowly in the Walcher position. As traction is being made, the pelvic bones should be firmly grasped, to prevent the joint opening too far. The bladder will protrude through the opening. In my first case the bones were separated quite 4 inches, but this is too great an opening. Tearing of the anterior vaginal wall may very easily occur. In primiparæ this is specially liable to occur, so the operation is not nearly so suitable for them as for multiparæ. When the child is born, the bladder should be pushed back, and the end of the bones brought as closely together as possible, by compressing the pelvis. Stout catgut stitches may be put through the capsule of the joint and periosteum of the bones to keep them together. The soft parts are then closed by silkworm-gut sutures. If there has been any tearing, the bleeding may be very profuse, for, as I have already said, the plexuses of veins are usually varicose. In my third case this occurred, and I had to tie a very large number of bleeding-points, and finally to plug the parts behind the symphysis with a strip of iodoform gauze.

To keep the bones in position, apply a broad strip of rubber plaster round the pelvis, and then a firm binder



FIG. 100.—Photograph of a woman on whom Cæsarean section was performed. Observe her height as compared with the height of an ordinary chair.

after the superficial wound has been dressed. The patient should lie upon her back, with sand bags at

either side to keep her perfectly still. The urine will require to be drawn off at regular intervals. The nursing of these patients is always very troublesome,



FIG. 101.—Side view of same.

especially if there has been any tearing of the vagina requiring plugging.

The patient should be kept at perfect rest for about

four weeks, to allow of good fibrous union between the ends of the bones.



FIG. 102.—Back view of same.

I have performed the operation three times on one patient successfully. In the second and third operations there was very little bleeding.

Subcutaneous Method, as described by Herman.

A sharp-pointed tenotomy knife is pressed through the mucous membrane, opposite the middle of the symphysis pubis. When the knife has penetrated the joint, cut downwards, until you reach and divide the ligamentum arcuatum. Then turn the blade and divide the upper half of the joint. When all the fibres are divided, the bones will at once spring about $\frac{1}{2}$ inch apart.

Delivery is then effected by forceps, as in the open method, and the subsequent treatment is the same.

This operation seems an exceedingly simple one, but I have had no experience of it. Judging from the difficulty I have experienced in cutting through the symphysis from above, I should say, that to do this subcutaneously will not be quite so easy as the description would lead one to suppose. In my first case, there was a decided bend in the joint, and to have divided it subcutaneously would have been very difficult, if not impossible.

Ayer's subcutaneous method, as practised by Buist, differs from this. An incision is made near the clitoris, and a director passed up in front of the joint. A probe-pointed bistoury is now inserted and the joint severed, the urethra being kept out of the way by means of a sound. If there is much bleeding after delivery, the cavity is plugged with a strip of iodoform gauze. Buist has got very good results from this operation. He has performed it twice on the same patient.

Hebotomy or Pubiotomy.—This operation was suggested by Gigli in 1894, and was first performed on a living subject by Bonardi, in 1897.

The operation first performed was an open one. The pubic bone was exposed by a large vertical incision, and then sawn through. Döderlein has modified the technique, so as to make the operation almost a subcutaneous one. Bumm has further modified it so that

the operation he performs is a true subcutaneous one.

Operation (Döderlein's method).—The patient should be prepared in the same way as for a symphysiotomy by shaving the parts and rendering them as aseptic as possible. The os should, of course, be fully dilated. A small incision is made along the upper border of the pubic bone, just inside of the pubic spine, and large enough to admit one finger. The index finger is then introduced behind the pubic bone, and the soft parts separated from it, and around its lower border. Then a metal carrier, with a suitable curve, and long enough to reach round the pubic bone, is passed along the finger as a guide and brought out below, at a point just external to the labium majus, the direction of the carrier being in the vertical plane. A Gigli saw is then drawn through by means of the carrier, and the bone is divided from behind. The divided ends spring apart, as a rule, causing considerable enlargement of the pelvis. If there is much bleeding, it can be controlled by packing the wound. The child is delivered by forceps or version. The small incisions are closed by a stitch or two. The ends of the bone are brought as closely together as possible, by compressing the pelvis and putting on strapping or a tight binder, and the patient is kept lying on her back with sand bags at either side. Some operators do not support the pelvis, but leave the bones slightly separated, so as to obtain a permanent enlargement of the pelvis.

Bumm performs the operation subcutaneously by using a sharp-pointed carrier, which he passes through the skin and round the bone without making an incision, and without using his finger as a guide.

I do not think that there is much to choose between these operations. Neither of them is as satisfactory as

a Cæsarean section, provided the patient has not been meddled with. If attempts to deliver have been made, and the disproportion between the head and the size of the pelvis is not too great, either of these operations would be preferable to Cæsarean section, as the risk to the mother would be less. The risk to the child is always greater than in Cæsarean section.

CÆSAREAN SECTION.

This is a very old operation, but it is only within recent years that it has become comparatively safe for the mother. With proper aseptic precautions it can now be done in suitable cases, with every prospect of success.

Indications for its Performance.—The absolute indications are pelvic deformities and solid tumours of the pelvis, or of any of the pelvic organs, which prevent delivery by the natural passages. When the passage is narrowed to $2\frac{1}{2}$ inches, or less, there is no chance of getting a live child through, and a craniotomy is very dangerous to the mother. Through a space of $2\frac{3}{4}$ inches it is possible to deliver a small child alive, but, if much force is necessary, the probability of its surviving is not great. In such a case, craniotomy could be done without very much risk to the mother, but it would, of course, be fatal to the child. The unborn babe has its rights as well as the mother, and they should be considered, though always subordinated to the mother's rights. In many cases, with the conjugate considerably above $2\frac{3}{4}$ inches, the operation is perfectly justifiable, where the head of the child is relatively large. This is especially the case in generally contracted pelves. In such cases, a man accustomed to abdominal surgical work would, in all probability, select Cæsarean section

when the child was alive and the mother in good condition ; while, on the other hand, a general practitioner, unaccustomed to surgical operations, would probably do well to perform craniotomy even on a live child. The conditions under which the operation is justifiable have all been referred to in dealing with obstructed labours. It has been recommended in cases of unavoidable hæmorrhage, and also in eclampsia, but for these conditions alone, I do not think it should be done. If they were complicated with a contracted pelvis or a solid tumour, then one might be forced to perform it.

In case of obstruction from a tumour, one may deal with the tumour, at the same time, removing it alone, or along with the uterus. In cases of osteomalacia, the disease can be checked by removing the ovaries alone, or the uterus as well. The question of sterilizing the patient arises. This can easily be done by tying the tubes in two places and cutting between the ligatures. Tying the tubes in a single place cannot be depended upon. This will in no way interfere with the menstrual functions, but will effectually prevent future pregnancies. The ovaries may be removed, or the entire uterus, but I do not think this should be done merely for the purpose of sterilizing the patient. If the uterus is infected, it certainly should be removed, lest the patient die of septicæmia, but in all cases in which the uterus is quite healthy, I think, it should be left. I cannot agree with Herman that, "except for child-bearing, the uterus is useless ; it is liable to disease, and it menstruates, which is a monthly illness." A woman with her internal organs of generation removed is ill-fitted to fulfil her functions in life. The question of sterilization of the patient is a very difficult one to decide in cases of contracted pelvis. I have always explained the matter to the patient and the husband,

and have invariably found they were both, especially the woman, most anxious to have it done. With a single woman it is, in one way, an even more serious question, because, if she knows that she cannot again become pregnant, she may afterwards recklessly follow evil courses. Such cases should be left non-sterilized, unless there is good reason for preventing future pregnancies.

In future pregnancies there is some risk of spontaneous rupture of the uterus, but this is not very great. I believe the risk of rupture is greater after the fundal than after the ordinary anterior incision. The operation may be performed repeatedly on the same patient, but there would probably be slightly more risk in subsequent operations than in the first. I have never done it more than twice on the same patient, as I have always sterilized the patient at the second operation, except in one case, where the adhesion was so complete, that at the second operation, I did not open into the general peritoneal cavity. At the second operations I have always found strong adhesions between the front of the uterus and the anterior abdominal wall. These adhesions seem to form even when the previous recovery has been perfectly afebrile.

Time of Operation.—Some operators prefer waiting until the actual labour has begun, but this is not necessary. If possible, the patient should be under observation and preparation a week or so before full time. As soon as the cervix is taken up, and the os will admit a finger, one can select a suitable time, and operate. If labour has come on, the sooner the operation is done the better for the patient, as she will be spared the suffering and exhaustion of prolonged labour. It is better to operate before the membranes have ruptured, and they should never purposely be ruptured

beforehand, unless there is over-distension of the uterus.

Preparations.—The patient should be prepared in exactly the same way as for an ordinary abdominal section. The position of the child should be ascertained by abdominal palpation, and one should also make sure that it is alive.* The bladder should be emptied, and the vagina thoroughly cleansed. Before making the abdominal incision, the skin, which has already been cleansed and sterilized, should be very thoroughly swabbed with turpentine, methylated spirits, and carbolic lotion, or it should be painted with iodine.

There should be one chief assistant, one for the anæsthetic, one for instruments, one to take the child, and another for the sponges.

Instruments.—A sharp and probe-pointed bistoury, scissors, dissecting forceps, a dozen pressure forceps, three dozen long straight needles, threaded two on each uterine suture; one aneurism needle, threaded with sterilized silk, for tying the tubes, if necessary; a half-curved needle, threaded with catgut, for stitching the abdominal peritoneum; and silkworm gut sutures for the abdominal wound. For controlling the hæmorrhage during the uterine incision, an ordinary large vulcanite pessary, as recommended by Cameron, is most useful. Properly sterilized silk is probably the best uterine suture to use, but catgut is often used.

Sponges made of gauze and thoroughly sterilized are the safest. I use them only once, so about forty are prepared.

Opening the Abdomen.—An incision about 5 inches long is made in the middle line, as high as possible, with about one-half of it above the umbilicus. The incisions which Prof. Cameron makes are represented in Figs. 103 and 104. When the abdomen is pendulous

he extends it above the umbilicus. I prefer a high incision in all cases, as it gives free access to the upper part of the uterus; there is no danger of injuring the bladder; and there is less risk of a hernia afterwards. The bleeding-points should be secured with pressure forceps. Then open the peritoneum to the full extent of the wound. The hand should now be passed in to feel how the uterus lies. It will usually be found rotated, so



FIG. 103.—Abdominal incision.
(Prof. Cameron.)

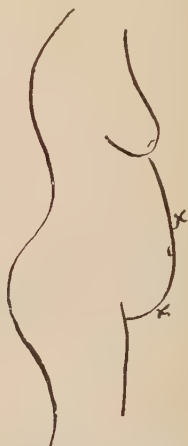


FIG. 104.—Abdominal incision
when the abdomen is pendulous.
(Prof. Cameron.)

that the middle line does not lie in the centre of the abdominal wound. Straighten the uterus, and place a large sponge at either side of it, to prevent blood or liquor amnii getting into the peritoneal cavity.

Uterine Incision.—This may be made longitudinally in the middle line, as high as possible, so as to avoid the lower uterine segment, or transversely across the top of the fundus. I do not think the transverse fundal incision possesses any advantages over the longitudinal ones, and if there should be a subsequent pregnancy,

the scar is more liable to yield than the longitudinal one. Press the pessary down firmly on the uterus, the assistant holding one side while you hold the other, then cut through the wall quickly. If the placenta does not lie beneath, the pessary will allow the incision to be made almost bloodlessly. The membranes will bulge into the incision. Remove the pessary, and quickly complete the incision upwards, with a probe-pointed bistoury, for from 4 to 4½ inches. If you have come down on to the placenta, you will cut into it, but you

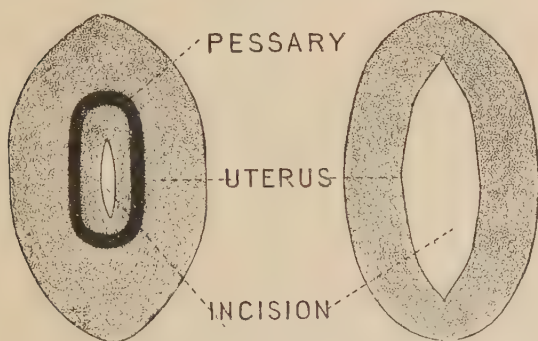


FIG. 105.—Uterine incision. (Prof. Cameron.)

do not require to cut through it. Finish your incision in the same way. Now quickly pass your hand into the uterus and grasp a knee or foot, and turn the child out. Some operators advise removing the child's head first, but in doing this you will be very likely to tear the lower part of the wound. I have never seen the wound contract and grasp the head. The child can be so quickly turned out that there is no risk of this happening. The incision of the uterus and delivery of the child should occupy only about one minute. If the uterus is firmly retracted round the child, considerable

force may be required to deliver it. As soon as the child is turned out, the assistant should grasp the uterus and bring it forwards. The placenta and membranes are usually expelled at once, and if they are adherent, they must be stripped off. Make sure the uterus is completely emptied. The edges of the wound are now rolled out, and bleeding controlled by the assistant grasping the uterus at each side of the wound between the fingers and thumbs. His right hand will grasp the upper half, and his left the lower. An attendant should take the child at once, tie the cord, and get breathing established. Very many of the children are born asphyxiated, and artificial respiration is usually



FIG. 106.—Assistant grasping the uterus. (Prof. Cameron.)

necessary. The deep uterine stitches should at once be passed. Begin at the centre of the incision and pass them from within, including the muscular and peritoneal layer, but not the mucous. With two straight needles on each suture, they can be very quickly passed. Place them about $\frac{1}{3}$ inch apart. When they are all passed, sponge the edges of the wound clean, compress the uterus with hot sponges to cause it to contract, and then tie the sutures tight. Some operators advise a superficial layer of sutures for the peritoneum, but this is not necessary, except in a few places where the peritoneum has not come close. Cut the sutures short and compress the uterus between hot sponges, if it is not well retracted. If the patient is to be sterilized, the tubes should then be tied and cut.

The veins in the broad ligaments will generally be found varicose, so care must be taken not to puncture one of them in passing the ligatures. The peritoneal toilet should then be completed, and the abdominal wound closed, by stitching the peritoneal layer with a continuous catgut suture, and silkworm interrupted sutures for the remaining layers. The wall is usually so thin that it is impossible to do it in three layers. The usual dressing is applied, and a firm binder. Any clots in the vagina should be cleared out. No drainage-tube of any kind should be placed in the cervix. Neither

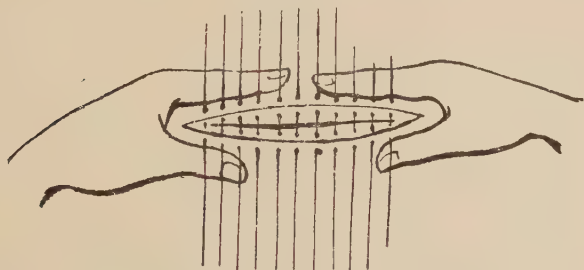


FIG. 107.—Uterine stitches inserted. (Prof. Cameron.)

should the interior of the uterus have been swabbed out, unless the membranes or placenta had been adherent. The less the interior of the uterus has been touched the better.

The after-treatment of the patient is exactly the same as after any abdominal section. If she has much pain, she may be given a small dose of morphia hypodermically. The urine should be drawn off in six hours or so, and she should be given sips of hot water from time to time, to allay thirst. The bowels should be moved within forty-eight hours by calomel and a saline. If her pulse keeps high, the outlook is bad, even although

the temperature does not rise much, but if the pulse keeps low, you need not be alarmed, even although her temperature should rise two or three degrees. If the first forty-eight hours are passed without any bad indications, and the bowels have been moved, there will probably be no further cause for anxiety. The abdominal stitches should be taken out in ten or twelve days. If the patient is able, she may be allowed to nurse her child. She should be kept in bed for about four weeks, and before she is allowed to rise she should be fitted with an abdominal belt, which she should wear for at least some months. When the uterus is involuted, it will usually be found to be more or less adherent to the back of the abdominal scar.

Removal of the Uterus.—This may be necessary in certain cases, as when there is a tumour of the uterus, fibroid or malignant; when the uterus is infected, as when attempts at delivery have been made by forceps without strict aseptic precautions; and in cases of osteomalacia. Precisely the same operation may be done in case of rupture of the uterus. I again repeat that, except in cases of osteomalacia, the uterus should not be removed, if it is healthy, unless one feels sure this will lessen the risk for the patient.

Porro's Operation.—The first part of the operation, up to the delivery of the child, is exactly the same as already described, only the abdominal incision should be made principally below the umbilicus. The uterus is then turned out of the abdomen, and the cervix secured in the lower angle of the wound by a *serre-nœud* and pins. The uterus is then cut away, the abdominal toilet completed, and the wound closed, leaving the secured stump of the cervix protruding at the lower angle. The part beyond the clamp is killed, and sloughs off. It is very difficult to keep it aseptic, and the

pressure of the clamp causes considerable discomfort to the patient. A hernia is very apt to form at the lower end of the wound, as this part is naturally weak. When the operation was introduced by Porro in 1876, it undoubtedly lowered the mortality markedly, but the newer method to be described is preferable. Porro's operation has this advantage—that it can be done very quickly, and it does not require any great amount of skill to perform it.

Instead of a *serre-nœud* and pins, two ordinary knitting-needles and an elastic ligature may be used to secure the uterine stump, as recommended by the late Lawson Tait. Equal parts of iodoform and tannic acid make a good dressing for the stump. It should separate in ten or twelve days.

Extirpation of the Uterus.—The uterus and cervix may be entirely removed, but, I think, it is preferable to leave the cervix, as this strengthens the pelvic floor.

The first part of the operation is the same as for ordinary Cæsarean section, only the abdominal wound should be made as low as possible. When the uterus has been emptied, an elastic ligature should be passed round the cervix, to control the bleeding. Then proceed to ligature the broad ligaments in sections and cut them. One of the ovaries may be left, by ligaturing inside it. When you get well down, incise the uterine peritoneum just above the vesical fold, and strip it down in front and behind. You can now secure the uterine arteries, and then amputate the uterus by making a **V**-shaped incision, the point of the **V** being downwards, so as to remove a wedge of the cervix. Now stitch the cervical stump with continuous catgut, then cover it with peritoneum by stitching the anterior and posterior layers together over it. The peritoneal

toilet is completed, and the abdominal wound closed in the usual way.

RISKS TO THE PATIENT IN THE ORDINARY OR MODIFIED OPERATIONS.

During the performance of the operation there is very little risk to the patient. The bleeding is not, as a rule, very great, and it can easily be controlled. Subsequent post-partum hæmorrhage is not likely to occur. If the uterus does not contract well, a hypodermic of ergotin may be given. I have four times seen failure of respiration occur, necessitating the performance of artificial respiration. This happened in my first case, just after I had emptied the uterus. Breathing was quickly restored. The other cases were much more alarming. In the first of these the patient's uterus was exceedingly tense, and just as I made my first cut into it the breathing stopped. The arms were quickly raised and depressed, but the patient made no effort to breathe, and I thought she was dead. In the hopes of saving the child, I quickly opened the uterus and delivered it, and the mother at once commenced to breathe, and gave no further trouble. The great pressure from the very large, tense uterus had apparently interfered with the action of the diaphragm. The child was alive.

Shock.—This is never very great, and the patients soon rally from it. If the patient has been long in labour, and her pulse is weak, a pint or two of normal saline solution should be run into the peritoneal cavity before the wound is closed.

Paralysis of the Intestines with great Abdominal Distention.—On two occasions I have lost patients who suffered from this. In neither case was there any indi-

cation of peritonitis found post-mortem. The pathologist could find no other cause of death.

Sepsis.—This is the chief danger, and the strictest aseptic precautions must be taken. If the patient can be properly prepared for the operation for a few days, there should be very little risk, but, unfortunately, one cannot always manage this. If the patient has been in labour for some time, and careless examinations have been made, the risk of sepsis occurring is great. In such cases, and especially in those where attempts to deliver have been made, extirpation of the uterus is the safer operation, if a Cæsarean section is absolutely necessary; but if a craniotomy can be done, it should be performed, even if the child should be alive.

Subsequent Dangers.—Intestinal adhesions may give trouble, and even cause obstruction of the bowels. If obstruction comes on, the abdomen should be reopened, and the adhesions relieved. If silk sutures are used, they may make their way out through the scar, or through the bladder, or vagina, months afterwards. If a sinus forms, a bloody discharge will come from it at each menstrual period. The sinus will not close permanently until all the sutures come out, and this may take months. As already stated, when the sutures make their way into the bladder, calculi will probably form on them. As, after every abdominal section, the cicatrix may yield and a hernia form, to guard against this the patient should wear an abdominal belt for a considerable time. I lost one of my cases from rather an unusual cause—viz. suppression of urine. So far as I know, this is the only case of the kind recorded.

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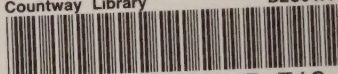
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